Influence of problem-based learning combined with community-based education and service as an integral part of the undergraduate curriculum on speciality and rural workplace choices

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Chapter 1

General introduction

Introduction

Medical education can roughly be distinguished into the pre-Flexner period of apprenticeship model of medical training, the Flexner era of biomedical approach to medical training and a new approach integrating community-oriented medical education.[1] The content and delivery of medical curricula is therefore becoming more student-centred in accordance with the changing role of medicine in contemporary society. Societal changes and modifications in medical education are likely to impact on the content of conceptually different undergraduate medical curricula.

An important challenge for today's higher education is the development and implementation of instructional practices that will allow students to acquire and apply skills and knowledge efficiently to solve problems in an efficient way.[2-4] Consequently, there is the need to create a learning environment that supports the constructive cumulative, goal-oriented acquisition processes in all students. Again, the environment should use as much as possible representative authentic, real life contexts that have personal meaning for the learners and offer opportunities for distributed and co-operative learning through social interactions. Many educational innovations have been implemented in the hope of achieving a meaning learning environment and also to address the needs of the community. Such educational innovations for example were the introduction of Problem-Based Learning (PBL) and Community-Oriented Medical Education (COME).

PBL at its fundamental level is an instructional method characterised by the use of patients problems as a context for students to learn problem solving skills and acquire knowledge about basic and clinical sciences.[5] The problem is the starting point of learning that serves as a puzzle that learners wish to solve, working in a small group setting and guided by a tutor. Barrows indicated that PBL is explicitly used to get students to think aloud.[6] This so called 'thinking aloud process' promotes the activation of relevant prior knowledge and makes students aware of uncertainties and gaps in their knowledge base.[7]

PBL also enables students to learn group-work skills and attitude, and improves their communication skills.[8] These skills and attitudes include team work, cooperation, respect for colleagues' views, chairing a group, and interaction with group members.[8] The interpersonal and communication skills that the students consequently acquire through the PBL process make them effective leaders and provides them with the ability to work with different members in the community.[8]

Community-Oriented Medical Education prepares health professionals to address the priority health needs of a community. The emphasis is on health promotion and disease prevention, the focus on populations. Such training could be situated in community, university, or other settings and augmented by distance learning. When located in a community setting, it is termed 'community-based education'. Community-based education is an instructional format where trainees learn professional competencies in a rural community setting focusing on population groups and also individuals and their everyday problems as well as providing service that meets identified community needs. Instructions generally take place at a community health centre or rural hospital. During their training in the community, students learn about social and economic aspects of illness, about health services in the community and methods of health promotion, about working in teams and types of problems encountered outside a hospital setting. The trainees engage in service provision such as giving health educational talks at the community schools, sorting and filling out-patient cards, dispensing medicine at the pharmacy, and going for outreach activities for immunization. Through these activities in the community, trainees not only learn but also provide service to the community, thus addressing some manpower gaps of the community.[9,10]

A number of medical schools in developing countries came to the realization that the Pre-Flexner and the Flexner model of medical education which relies on tertiary referral hospitals as the sole platform for training was suboptimal for graduating doctors who are able to address local community health needs.[11] One of the first schools that addressed the question of relevance of medical education to the nation's health needs early in the 1970s was the Obafemi Awollowo medical school in Nigeria[12], through community based education and service (COBES).
COBES describes "learning activities that use the community extensively as a learning environment, in which not only students but also teachers, members of the community, and representatives of other sectors are actively engaged throughout the educational experiences''.[13] COBES, which has nowadays become widely accepted as an important innovation in undergraduate medical training, was at the time considered as merely an educational intervention to address local, rural community health needs.

There is a however wide diversity of how 'rural' is defined and these definitions can be conflicting.[14] The nature of the term 'rural' thus varies from place to place and from context to context. It often refers to areas in a country which are less densely populated. There are different types and/or definitions of 'rural' areas, depending on how different the associated economic, environmental and social factors are from those in urban areas. 'Rural' is defined with distinct characteristics of rural area to

include isolation, limited access to healthcare resources, small population, significant distances between services and providers and informal social structures.[15]

Both career choices and recruitment and subsequent retention of healthcare professionals in the rural areas are a major challenge to the health sector; in the contemporary era this challenge is a worldwide concern leading to manpower shortages resulting in poor health care quality for the rural communities.[14] This maldistribution of health personnel and services has been reported not only in the developing world but also for industrialized countries such as the United States and Norway.[16,17] The search for solutions to this global problem has been central to the policies of many governments and stakeholders in health professions education. There is evidence that COBES can help attract healthcare professionals to the rural areas and bring equity in the distribution of health professionals to benefit rural communities.[12,18-20] Despite the acknowledgement that many challenges of COBES remain, both students and community members have expressed high satisfaction of the usefulness and benefit of COBES.[19,20] Furthermore, COBES has been identified to be an important approach to train doctors and other health professionals who are willing and able to work in the underserved areas, particularly rural communities.[16,21,22]

In a recent innovation in medical education PBL and COBES have been integrated as different parts of the same undergraduate curriculum. This new approach aims to train a team of health graduates with considerable knowledge and skills to work effectively in both rural and urban areas as well as to provide comprehensive healthcare. Some medical schools continue to train medical students with the traditional curriculum which is discipline-based, and in which lectures constitute the main instructional format, during which students passively acquire knowledge.

While PBL may have advantages in promoting student learning, Glick argues that a community-oriented approach can be successful *without* a problem-based curriculum.[23] PBL can enhance both problem-solving and community-based education, if careful selection of the problems to be studied and the settings in which the students will learn to cope with them represents authentic, practical experience.[24] Again, if the emphasis in PBL is on relating the learning experience to the real world in which trainees practice after graduation, then PBL may have significant impact on community-based education, given the roles of trainees as public health workers, general practitioners and community leaders.[25]

Theoretical framework underpinning this thesis

PBL as a social constructive theory

Problem-based learning (PBL) evolved out of the 'learning by discovery' approach and the 'case study method'[26] as a special way of acquiring knowledge about subject matter.[27] Barrows indicated that PBL is explicitly used to get students to think.[6] This thinking aloud process promotes the activation of relevant prior knowledge and makes students aware of uncertainties and gaps in their knowledge base.[7]

Many cognitive theories which are deeply rooted in the curricula of higher education focus on how people think about or process the information they receive from the environment.[28] How people come to understand or know is rooted in the *philosophy of constructivism*, where learning is seen more as constructing knowledge from the information one receives rather than directly receiving that knowledge from the outside world.[28] For example, Tolman's concept of 'cognitive map', the Gestaltist concept of 'closure', and Piaget's concept of 'cognitive structure' all involve constructing knowledge for oneself rather than absorbing it exactly the way it is presented.[28] These theories emphasise that knowledge cannot be transmitted automatically from teacher to learner. Ideally, the students learn to analyse and solve relevant problems, they acquire knowledge that is retained over a long time that is relevant and can be used, they develop self-directed skills for life-long learning and more so, the students adopt an active attitude towards learning. In contemporary education there is a great deal of interest in active learning.

Active learning occurs when learners are challenged to exert their mental abilities while learning.[29] Active learning plays a pivotal role in *constructivist theories of learning*. Some general learning principles are considered characteristic of constructivist approaches. These will subsequently be discussed in the next sections.

Firstly, learning is more powerful if learners are active participants in the construction of their own knowledge instead of passive recipient of other's teachings. This means that students should form and test their own hypotheses, interact with their environment and reflect on their learning processes and outcomes. Here the process of construction occurs separately within each learner, reflecting a perspective known as individual constructivism.

The *second principle* is that knowledge construction is stimulated by the nature of students' interactions with persons and objects in their environment. Students work together to make sense of their world. Students may form a study group when they

attempt to learn from a difficult and confusing textbook; helping one another, they may be able to interpret and understand the book in ways that they may not have been able to do so when working alone.[29]

Theories of learning that focus on how student work together, either at a single sitting or over the course of many years, reflect a perspective known as *social constructivism*.[28] Socio-constructivists take the view that a person's knowledge is internalised as a result of their interacting with the social environment.[30] The socio-constructivist approach focuses on individual cognitive development within the context of social interactions.

PBL as a collaborative learning approach

Collaborative learning assigns learners an active and constructive role in their own learning.[31] Consequently, collaborative learning fits with the constructivist views of learning. PBL as a collaborative learning environment fits well into the theory of social constructivism.

Although different learning theoretical approaches towards PBL can be used, and different institutions use different format of PBL, Barrows nevertheless distinguished six core characteristics of PBL[32]:

1. Learning is student-centred.
2. Learning occurs in small groups of students.
3. A tutor is present as a facilitator
4. Authentic problems are the starting point for learning
5. The problems are used as a tool for achieving knowledge anchoring that knowledge to the problem and thus acquiring problem-solving skills
6. New information is acquired through self-directed learning.

In recent years, PBL studies are presented more and more as an example of a *collaborative learning environment*.[33,34] Collaborative learning situations can stimulate students to develop a deep learning approach.[35] According to Lehtinen[36], collaborative learning refers to instructional methods whereby students are encouraged or required to work together on learning tasks. The central ingredients of collaborative learning are that:

1. Learning is an active process
2. Students engage in small-group activities
3. The teacher is a facilitator rather than an expert of knowledge
4. Students must take responsibility for their own learning
5. Students benefit from being part of a small and supportive academic environment.

In this definition of collaborative learning, students collaborate in small groups to achieve common learning goals. Through collaborative learning students develop a critical understanding of the material and integrate new knowledge into their prior knowledge instead of just memorising facts for reproduction.

COBES as a form of collaborative learning environment

In COBES, the students use the community as a learning environment. In this regard COBES can also be considered as *situated learning*. The cognitive theory also places a considerable emphasis on the importance of the immediate environment i.e. the 'context' in learning and behaviour. *Contextual learning*, also known as *situated learning or situated cognition*, or *distributed learning* refers to situations in which learning and thinking occurs and are influenced by the physical and social contexts in which people are immersed. Contextual learning is also described by Dillenbourg et al and Van der Linden as socio-cultural (or shared cognition theory) which is another form of constructivism. This theory has its roots in Vygotsky's theory about the zone of proximal development.[37] In this theory, learning is seen not as a process occurring solely in the learners mind, but as a social and situated process of joint knowledge construction.[38]

According to Schmidt, a close relationship between COBES and PBL from a theoretical perspective exists.[39] COBES describes those "learning activities that use the community extensively as a learning environment, in which not only students but also teachers, members of the community, and representatives of other sectors are actively engaged throughout the educational experience".[40] In this respect PBL can thus be considered situated, collaborative learning.

There are several arguments favouring a positive influence of PBL with COBES as part of the undergraduate curriculum on specialty choice and attitude towards working in the community, and these will consecutively be discussed.

In the *first* place, the closer the resemblance between the situations in which something is learned and the situation in which it is applied, the better the performance. COBES provides unique opportunities to learn in an environment that 'typically resembles' what students will encounter in later professional life. This kind of contextualized learning has several advantages including development of confidence.[39]

Secondly, information is better understood, processed and retrieved if students have opportunities to elaborate on that information. COBES provides a chance for

elaborating and collaborating on information. Since students will be considered as 'experts' by the community, they will be asked questions, deliver talks about health education, discuss its problems with the community, and try to explain different phenomena observed in the community. In this way community-based education can enhance learning in much the same way as in problem-based learning. Just like PBL, COBES provides an opportunity for collaborative learning among students on one hand and the people in the community on the other.

Furthermore, as students work together in the community their knowledge is internalised as a result of their interaction with other stakeholders in the community which serves as a social environment. The students learn in the context of social interaction. In contextual learning, students' learning and thinking are influenced by the physical and social context in which they are immersed or situated (social constructivist theory). The students interact with community members and health experts in the community which provides real opportunities for modelling and socialisation. Repeated interactions and collaboration with members of the community creates emotional situations that tend to awaken the civic responsibility towards these rural communities among the students. As students observe the behaviours of community members, especially the health workers and other civil servants they form their own opinions and consequently their attitudes and these may influence the students in their future career choice.

Role modelling as a form of social cognitive theory

Strong evidence, based on research findings, support the influences of role models on others and the importance of positive role models in enhancing learning and influencing the career path of medical students and graduates.[41] Medical education as a form of adult socialisation is generally characterised by the strong motivation of students to acquire the knowledge and skills of the professional role. To be most effective, learning must be undertaken in an environment that emphasises a spirit of enquiry, is supportive and understanding of students' needs and aspirations and characterised by civility and sensitivity to cultural, ethnic and gender issues as they relate to students, teachers and colleagues.[42]

Both the learning environment and role modelling which occurs during COBES therefore may have a positive influence on students' career choices. When students receive early and sustained exposure to rural communities and to rural physician role models, their perception to practice in rural areas may be influenced[43] and can also provide the students the opportunity to understand health and illness in the rural context.

Role modelling is deeply rooted in *social cognitive theory (social learning theory*) of learning where learning is enhanced when students can observe and emulate the thinking and actions of expert role model.[41] *Role modelling theory* proposes that individuals perceive their identity in relation to those with whom they associate, those who have related roles and these affect or are affected by the individual's identity and performance.[44] A basic premise of social learning theory is that the observer's behaviour can be 'substantially modified as a function of witnessing other people's behaviour and its consequences for them.[45] Research findings indicate that positive role models can have a strong influence on specialty choice of students and is important in shaping and reshaping learners' views of their future careers.[46] It is most likely that students will gravitate towards specialties where they see inspirational role models. Knowing which characteristics students look for in their role models should therefore help to identify the physicians who may be most influential in medical students' and young graduates' career choices.[47]

Bandura[48] argued that people generally adopt the standards exhibited by exemplary models. Bandura's theory of modelling involves four interrelated concepts.[45] *Firstly*, mere exposing the observer to modelled behaviour will not ensure that behaviours are attended to, recognised or differentiated. Bandura argues that in order for learning to occur, observers need to be repeatedly rewarded and the modelled behaviour needs to be reinforced. *Secondly*, Bandura[45] stated that the ability of the observer to retain the observed behaviour is crucial. Two mechanisms can aid the retention. Initially there is a rehearsal of the behaviour, i.e. practice of the behaviour. Following this, symbolic coding operations occur when the student codes and recognises and classifies elements into familiar and easily remembered patterns. Bandura's[45] *third* assertion is that the student must be able to convert what they have observed into an appropriate action. Mastery comes from successful performance. It has been hypothesised, that self-efficacy plays an important role between knowledge and behaviour (Bandura, 1991; Bandura, 1986). Bandura[45] states that role modelling is much more than imitative behaviour, it has a major influence in the observer's behaviour. The *fourth* concept according to Bandura[45] is that what and how much the student will learn from the observation will depend on their incentives and motivation to do so.

Furthermore, role models and learning environment are critical to effective education and must be thoughtfully and thoroughly considered by all teaching faculties. A learning environment exists wherever and whenever students gather. The learning environment embraces numerous factors that contribute to effective education and is the background in which a curriculum resides.[49]

In summary, PBL, COBES and role modelling are closely related as they all conform to the social cognitive theory of learning.

Factors influencing taking up rural practice

Socio-economic conditions negatively impact on healthcare professionals to work in rural areas. Although this might not be the case in developed countries, the same cannot be said to be true in developing countries. A number of factors affect students' future practice especially in the rural areas. These factors can be social, economic and educational. Social factors that can influence future practice of student include demographic factors (e.g. gender, age, rural background, prior experience, family background, religious background, and personality type),
Rural background (those who were born and grew up in the rural area) has been found to be associated with future rural career choice. This is evidenced by a considerable number of studies from America[50] Australia[51-53], Canada[43], Japan[53], Norway[16], South Africa[54] and Scotland[55] that have confirmed that medical students with a rural background are more likely to take up rural medical practice than their peers from city origins.

Also, most of the studies have been centred on selecting students of rural origin into medical schools with the hope that they will return to the communities after graduation. Although rural origin is a strong motivating factor for students to return to rural practice in the developed world and has been factored into admission policies, this has not been included in the admission policy of most developing countries either because of lack of enough evidence of this factor as a strong motivator to return doctors and other healthcare professionals to the rural areas after graduation.

In assessing the perception of newly admitted undergraduate medical students on community placement and working in rural areas of Uganda, most interviewees suggested that they would only work in rural areas if the financial situation of the health worker in rural areas were to improve through active improvement of remuneration from either the central government or the local government.[56] Financial remuneration is seen as a motivating factor for placement in rural areas; however, the strength of association of financial incentive and choice of practice location needs further investigation. There is the need to investigate further what other factors apart from financial incentives that positively or negatively affect the choice of specialty and practice location. A remaining question that needs to be addressed thus is: Will the exposure of students to PBL with COBES as integral part of the curriculum influence trainees to choose a specialty in public health and work in the rural community?

Perceptions of stakeholders about the usefulness COBES

It is hypothesized that the perception of stakeholders about the usefulness COBES can have an influence on students' willingness to work in a rural area and may have an effect on career choice. COBES exposes the students to the public health and primary healthcare needs of rural communities early and throughout their education. Through the working activities, COBES aims to instil in students the importance of developing community partnerships, engaging communities as a means of implementing sustainable healthcare initiatives.[57] Community partnerships are defined as groups working together with shared goals, responsibilities and power to improve the community.[58] The community partnerships in COBES include the community members, governmental and non-governmental organisations, students, faculty members, and health facility staff. By building partnerships between the university, the community and the service providers, the students learning and service activities become relevant and prepares them to care about their community. Through this cooperation there is the creation of social capital for social accountability to the community. Social accountability is the obligation to direct education, research, and service activities towards addressing the priority health concerns of the community, region, and/or nation they have a mandate to serve'. There is growing evidence that involving community members in planning, developing, implementing and evaluating health programmes in their own communities go a long way to bring success and sustainability of such programmes.[57]

The inclusion of community members in the assessment, development and execution of public health interventions serves as the foundation for developing interactive community partnerships and lies at the core of community-based education. Integrating the community in this way helps build trusting relationships and enables programs developers to better understand cultural nuances, gain perspectives into the needs and opinions of the community and serve as a guide to cater for interventions to accommodate unique community identity.[59-62]

In assessing the perception of the community on COBES in Uganda, Mbalinda et al reported that the community felt that COBES had significantly impacted in decreasing disease, increasing health and encouraging health seeking behaviour.[57] A study conducted by Jinadu et al. revealed that there are differences in community perceptions and acceptance of COBES programme.[63] While one community competed for the programme and even donated generously for its sustenance, another community merely accepted it and cooperated with the medical school. Factors that were identified as influencing community perceptions of the COBES included the approaches used by the medical schools for entry into the community, the clarity of the

aims and objectives of the programme to the community leaders and members, and the level of education and urbanisation of the communities.[63]

Medical education today is under severe tension between 'maintenance of standards' and 'relevance to the needs of the population served'. A standard is a level of excellence and conventional schools turn to separate 'standards' from 'relevance', whereas innovative schools do not.[64] Daubenton states that one is excellent only if one is relevant.[65] According to Danbenton, medical education can only be considered excellent if it is responsive and relevant to local needs. In community-based education learners are encouraged to actively apply concepts and information, skills or attitudes to local situations. The experiences in the community challenge the students to identify and consider why parts of their neighbourhoods are in such disrepair and their role in continuing such inequity to exist or desist. They get acclimatised with the environment and they see the community as 'my community' which awakens their civic responsibility towards that community. Through their continued exposure to the community as part of their training, they learn, acquire social skills and provide services and through that they may develop the appropriate attitudes towards their studies and future practice.

Another important predictor of rural practice and choice of specialty reported in the literature is exposure to rural training. What aspects of rural exposure will result in a favourable attitude towards rural practice and hence help influence students' desire to return to rural community? Does the type of curriculum have an influence on trainees choose to accept rural posting?

Effect of curriculum types on trainee choice of practice location.

In evaluating community-based education and service, which has been implemented in a number of innovative and traditional medicals schools in Nigeria, Jinadu et al 2002 concluded that *innovative schools* were better exposed to Primary Health Care (PHC) education compared to those in the *traditional schools*. The perception of the objectives and functions of PHC education were significantly different and the attitude of members of the rural community were also favourable to the programme.

Most of the medical schools studied did not have a PBL approach with COBES as an integral part of the curriculum. The innovation described in these schools was 'merely' the introduction of COBES into the traditional curriculum.

The authors of a recent Best Evidence Medical Education (BEME) review of research from 1992-2001 on the effect of preclinical experience in clinical and community settings noted that, early experience in a community setting "can have a lasting impact on students' learning which can influence career choices".[66] There is also evidence that

early clinical experience can promote the empathy of students towards ill people, increase students' understanding of how living conditions influence health and disease, and improve students' communications skills.[66]

In the combined PBL/COBES approach to teaching and learning, students develop the spirit of teamwork, collaborative learning, become life-long and independent learners and this may affect their attitude and motivation to work in rural areas as they enhance their skills to work in a team and collaborate with community members. McAllister et al., 1998, reported that students identified teamwork as a positive benefit in rural setting, as this boost their value of friendliness with the local community and staff.[67] These findings give direction to curriculum content to emphasise the value of teamwork and to highlight the rich social opportunities in rural communities.[67] It may be that students who are exposed to the PBL/COBES curriculum will have a positive attitude to the rural community, a hypothesis which this research seeks to uncover. As they become independent and life-long learners they may be intrinsically motivated to pursue professional development careers at the community through distance learning while still working at the community with the right conditions in place.

Most of the documented literature on rural exposure of medical students in Australia and Canada reported on exposing students to rural clinical schools. The difference here compared with PBL/COBES curriculum where students go the community early in the preclinical years, is that the students still follow the pre-clinical traditional, lecture based curriculum but in the clinical years, students are sent to clinical schools located in the rural areas.[68]

Nevertheless, authentic human contact in a social or clinical context during the early years of training, the literature suggested, could help medical students learn and develop appropriate attitudes towards their studies and future practice. This authentic human social contact could orientate medical curricula towards society's needs.[69] A study was conducted in Makerere University in Uganda that sought to assess first year students' perception on experiential training through community placement and factors that might influence their willingness to work in rural health facilities after completion of the training.[56] Though Makerere University College of Health Sciences runs a PBL/COBES curriculum, the research was limited to finding the perceptions of first year students in rural practice; however, as to whether the curriculum type (i.e. PBL/COBES or traditional) itself has an influence in the future place of medical trainees in the rural setting was not explored. Furthermore, limiting this work to first year students did not allow an assessment of the views of continuing students after exposure to rural communities. We don't know if older students share these views and whether these views are comparable with students using a traditional curriculum?

Summary and research questions

In summary, from the above it is clear that rural settings in the developed world can have a completely different meaning from rural settings in the developing world and this poses even more unexpected challenges to rural placement in the latter. A number of factors that affect trainees' future practice especially in the rural areas have been identified from studies conducted principally in Australia, Western Canada and South Africa.[70] Will these factors be the same for developing countries were most rural dwellers are drifting to the cities for work and better living conditions which is absent in the rural areas?
Magnus and Tollan describe the success of the University of Tromso Medical School ,Norway using an innovative curriculum including COBES, in educating physicians who preferred to practice in the underserved rural areas of northern Norway.[16] Most of these research findings were conducted in rural setting in Australia, Canada and the United States.[43,50-52,71] However, the educational effect of the innovative PBL/COBES curriculum on career choices and placement of trainees in countries within the developing world, such as Ghana, had yet to be studied. Consequently, Ghana is the context for the studies described in this thesis.

Local Ghanaian context

In Ghana, most of the communities are considered as rural. Localities with 5,000 persons and above have been classified in Ghana as urban since 1960. The growth of urban population notwithstanding, Ghana continues to be a nation of rural communities with a rural (less than 5,000 persons in a locality) residency average estimated to be 67 percent of the population in 1992. Six of the country's ten regions had rural populations of 73 percent.

In Ghana, undergraduate medical training consists of three years basic of science training and three years of clinical training, for a total of six years duration. There is a strict policy for the selection of students for admission into universities. The universities mainly consider the best aggregate score on six subjects (three core and three elective). The problem is compounded by the huge numbers of applicants vying for the few places to study medicine, making entry into medical school very competitive. Most students who gain admission to medical schools are typically from the cities where the pre-university schools have the best educational facilities, and better and well-trained teachers compared to those from the rural areas.

The teaching and learning methodology are largely a conventional discipline, using a lecture-based approach. Recently, however, there have been calls to revise this methodology towards a student-centered, self-directed problem-based approach to medical education. In May 1992, the University for Development Studies (UDS) was established by the Provisional National Defence Council (PNDC) Law 249 as a multi-campus university, the fourth public university to be created in Ghana. Established in 1996, the University for Development Studies, School of Medicine and Health Sciences (UDS-SMHS) was created as a medical school with the clear mandate in the training of health care professionals, to execute a curriculum at the centre of whose philosophy is problem-based learning, community-based education and service (PBL/COBES). In responding to its original mandate and the calls for change in the teaching and learning methodology, the UDS-SMHS, was the first school in Ghana, and probably in the West African sub-region, that adopted and implemented a PBL/COBES curriculum for its medical students in 2007. Until then, the UDS-SMHS had been using a conventional, lecture-based, discipline- and department-organized curriculum.
The approach to be used in training students since 2007 was problem-based, student-oriented, interdisciplinary and community-oriented. This innovative curriculum is aimed at training and orienting doctors and health professionals who are willing to serve in the rural communities.

The proposed research questions and associated studies in this thesis will explore whether, as students' advance along their academic years of study, using the PBL/COBES and traditional curricula they will develop a favourable attitude towards working in the rural areas, and these views will be compared between the two curricula type.

Research questions

The key research questions of this thesis addressing the rural urban medical workforce are:

1. Will the introduction of an innovative curriculum of PBL with COBES help attract health professionals to the rural areas and also assist to address the inequity of doctors in the rural Ghana?
2. a) What benefits does COBES bring to the community, students and facility staff?
   b) What are the challenges of COBES to stakeholders? and
   c) What contribution can other stakeholders together with the community bring on board as contribution to improve and sustain COBES for the mutual benefits of both?

Thesis outline

This thesis consists of 8 Chapters. The main research question 1 is addressed in Chapters 4,5 and 7. Chapters 3 and 6 address the main research question 2.

Chapter 1 introduces the theme of Problem-Based Learning/Community-Based Education and Service in undergraduate medical education. It outlines the theoretical underpinning of PBL and COBES from the field of socio-constructive and social learning theories and further introduces the purpose and justification of the studies.

Chapter 2 is a systematic review on the role of COBES to address the disparities between the distribution of doctors in rural communities as compared to urban areas in Africa. It explores studies on the role of COBES or rural outreach programmes as an educational interventional in addressing the unequitable distribution of doctors in the rural communities.

***Chapter* 3** explores the usefulness of COBES from the perspectives of the community, students and faculty and its benefits to the rural community as well as to the students.

As role modelling is very important in medical education as a form of adult socialisation. It is characterised by the strong desire of students to acquire the knowledge and skills of their professional role models.

Chapter 4 therefore explores the characteristics of positive and negative role models for students during their COBES rotation that are likely to influence students in their career choices and willingness to work in the rural areas after completing medical education.

Chapter 5 explores the influence of COBES on medical graduates' choice of specialty and their willingness to work in the rural areas after being exposed to the rural community as part of the medical training.

Chapter 6 reports on why doctors choose to engage in rural practice and explored the factors that influenced medical doctors' decision to practice in rural Ghana.

Chapter 7 studies the types of curricula used in the training of medical students in Ghana and their respective influence on trainees' choice to practice in the rural community after completing medical training using a PBL/COBES curriculum or a traditional curriculum.

In ***Chapter 8*** we discuss the main findings of our study, summarise and synthesise the results and relate them to existing empirical and theoretical research. Finally, we provide our thoughts on implications for practice and recommendations for future research in the general discussion of Chapter 8.

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Chapter 2

The role of Community-Based Education and Service (COBES) in undergraduate medical education in reducing the mal-distribution of medical doctors in rural areas in Africa: A systematic review

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Submitted

Abstract

Introduction
Community-Based Education and Service (COBES) and rural outreach programmes are increasingly being used in the delivery of undergraduate medical education in rural communities to address the disparity of health workers across the world, especially in the developing countries. This systematic review describes whether COBES as part of the undergraduate medical training, aids in addressing the maldistribution of doctors in Africa.

Methods
A critical literature search through key data sources identified studies that focused on COBES as an educational intervention which addressed recruitment and retention challenges in Africa. Data are presented as a narrative synthesis due to the varied methodological designs adopted by the various studies reviewed.

Results
This review reveals that relatively few medical schools are so far using innovative curricula incorporating COBES and rural outreach programmes to train medical students with the hope that they will opt for rural practice after graduating. Given the gaps in human resources for healthcare especially in the rural areas and lower levels of service delivery in Africa, students' contributions to health delivery at facilities and in communities are expected to bridge the gaps in services delivery at the primary health care level. Some medical schools from African countries, have consequently scaled up their rural components in the undergraduate curricula, thus responding to changes in health and making medical education more relevant to the needs of rural communities. There is now increasing evidence that COBES and rural outreach programmes are indeed making an impact on health services delivery in the rural areas. Graduates of institutions that incorporate COBES and rural outreach programmes have testified that their present practice location in the rural communities was influenced by the undergraduate rural exposure through COBES. There is growing evidence that exposure of health professions students, especially medical students, to the rural areas influences their eventual choice to work in the rural areas after graduation.

Conclusion
Based on this review, it is strongly recommended that COBES/rural outreach programmes should be made part of the undergraduate medical curricula in all health training institutions in Ghana in particular, and the sub-Saharan African sub-region in general.

Introduction

Medical education can roughly be distinguished into the pre-Flexner period of apprenticeship model of medical training, the Flexner era of biomedical approach to medical training and a new approach integrating community-oriented medical education.[1] One of the schools in Africa that addressed the question of relevance of medical education to the nation's health needs, as early as in the 1970s was the Obafemi Awollowo Medical School in Nigeria.[2] One of its key objectives was to train a team of health graduates with considerable knowledge and skills to work effectively in both rural and urban areas as well as to provide comprehensive health care to a defined geographical area, in partnership with members of the community. In the decades thereafter. a number of other medical schools in developing countries came to the realization that the Pre-Flexner and the Flexner model of medical education were not sufficiently adequate to produce graduates able to address local community health needs.

The latter approach, the so-called Community-Based Education and Service (COBES) which has become widely accepted nowadays as an important innovation in undergraduate medical training was at the time considered as an educational intervention to address local community health needs. Community-Based Education and Service (COBES) is the "learning activity that uses the community as a learning environment, in which not only students but also teachers, members of the community, and representatives of other sectors are actively engaged throughout the students' educational experience".[3] COBES is increasingly being used in the delivery of undergraduate medical education in rural communities to address the disparity of health workers across the world, especially in the developing countries.

The first objective of COBES is to address the discrepancy between types of patients seen by students in the context of a teaching hospital and types of patients who present themselves at the healthcare facilities in the rural communities.[4] The second objective is to inculcate in the students that the efficiency of health services in the rural communities may benefit more from inclusion of health promotion and the prevention of diseases than from curative care[5]; and thirdly, COBES aims to reduce the inequity with respect to access to healthcare services by improving access to health facilities in the rural areas.

Despite the acknowledgement that many challenges of COBES still exist, both students and community members have expressed high satisfaction about its usefulness and benefits.[6,7] Furthermore, COBES has been identified to be an important approach to train doctors and other health professionals who are willing and able to work in underserved areas to bring equity in the distribution of health professionals,

particularly to benefit the rural communities.[2,8-10] Nevertheless, a common understanding and overview of the evidence of the impact of COBES in influencing graduates' choice of specialty and willingness to accept rural postings in Africa is lacking. This systematic review will look at the strengths and weaknesses of COBES as an educational intervention in addressing the maldistribution of doctors to the rural areas in African countries.

Objective

To determine whether COBES, considered as part of the undergraduate medical training, aids in addressing the maldistribution of doctors in Africa.

Methods

Search strategy and data sources

Key medical education journals indexed in MEDLINE, CINAHL, ERIC, EMBASE, PsycINFO and Google scholar were systematically searched using search terms pertaining to community based medical education, namely *were medical students, undergraduate medical education, medical school curriculum, medical education, service learning, community-based education, community-based education and service (COBES), career choice, practice location, retention, rural areas, remote areas, recruitment, specialty, developing countries and Africa.* We searched for other additional publications in the bibliographies of the retrieved publications.

Inclusion criteria

Studies that included recruitment and retention outcomes of medical school programmes were selected regardless of design and methodology. This was done because of the relatively limited literature published in the field; and only if the primary goal of the publications was about the role of community-based education in addressing the disparity of doctors in rural areas. The search date was from 1990 to 2018. This date range was chosen because preliminary search indicated that the integration of COBES into health professions curricula gained prominence in the 1990s. Only English language studies performed in African countries were selected and reviewed, since this review focuses on the effects of COBES in Africa.

Exclusion criteria

Studies that focused on admissions of students with rural background in addressing the disparity of rural doctors were excluded. Programmes that described a single rotation in the rural community not explicitly addressing attraction and retention were also excluded, as were publications that addressed rural, non-medical programmes. Finally, we excluded publications not in the English language.

Data extraction and analysis

Data were extracted by screening titles and abstracts of articles following guidance from previous related systematic reviews.[11-13] The titles and abstracts of each paper were independently assessed for inclusion 1by the first author. Consensus was reached by all authors on which articles to be included in the review.

Data extracted included inclusion/exclusion criteria, study population, context of intervention (i.e. students, practicing health workers), specific intervention (i.e. Community-based education, rural outreach rotations), method of data collection, method of teaching and learning, and key findings (outcomes). We used a narrative approach due to the different study designs, contexts and outcomes.

The overview of the selection process is provided in figure 2.1. The search of the electronic data yielded 309 publications. A further search using the so-called snow-balling approach to identifying further literature from the reference lists in relevant journal yielded 16 additional articles giving a total of 325 publications. The titles and abstracts of each publication were screened resulting in 155 duplications being removed. Another 144 studies were excluded after reading through the abstracts because of irrelevant programme context and others were rejected because they were done outside Africa. The end result was that 26 articles were retrieved and reviewed in full and the reference lists of these journal articles were reviewed again using the snow-balling approach. After applying the additional inclusion and exclusion criteria such as irrelevant materials and non-Africa studies to the abstracts and full-text articles, 18 were finally picked for inclusion in this systematic review (Figure 2.1).

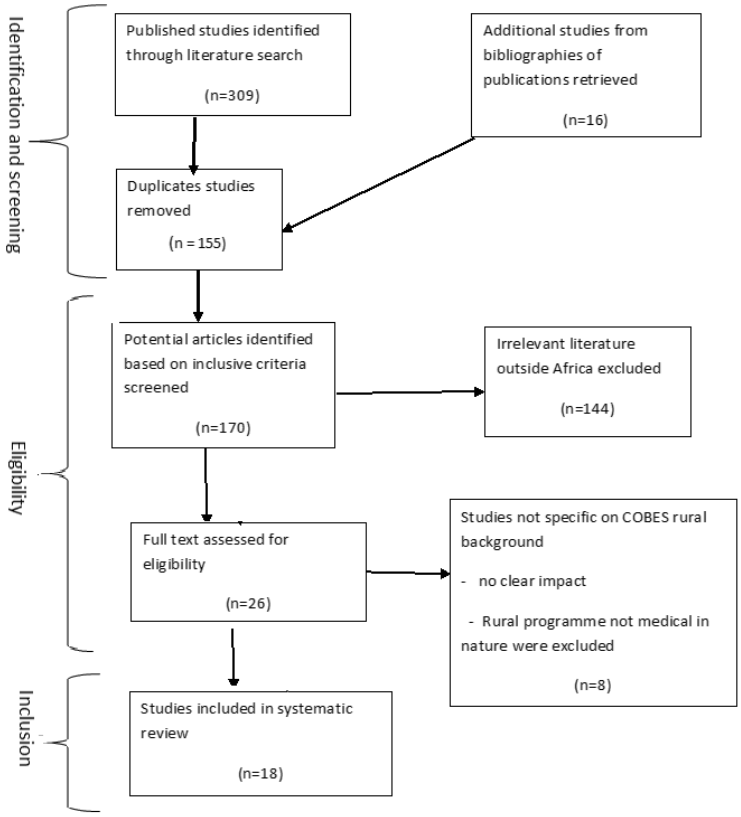

Figure 2.1 Reporting studies for systematic review (PRISMA Diagram)

Results

General characteristics of the studies

Table 2.1 gives a summary of the 18 studies conducted in Africa: Ghana 4, Uganda 6, South Africa 4 and one each from Nigeria, Tanzania, Democratic Republic of Congo and Botswana. All the studies were conducted in medical or health profession institutions among students, tutors/supervisors and graduates. The study methodologies were qualitative in nature employing cross-sectional descriptive studies using open-ended questions, individual interviews and focus group discussions and internet-based survey and a review

Table 2.1 Characteristics of studies included in the systematic review

Country	Reference	Study Population	Data collection methods	Key findings
Ghana	Amalba et al., 2018	Medical doctors	Questionnaire	63% of the doctors working in the rural community were UDS-SMHS trained. Doctors advocated for a policy on rural rotation, integration of rural rotations/outreaches into the medical curricula and accreditation of district hospitals for training
Ghana	Amalba et al., 2016	Medical graduates	Anonymous questionnaire	64% will choose to work in the rural area, 82% found COBES to be very useful 61% and 68% of graduates from urban and cities respectively indicated that COBES will influence their practice location Adapted to rural lifestyle Identified community health needs
Ghana	Amalba et al., 2016	Medical students		60% of students perceive COBES to influence their practice location
		Lecturers	Anonymous questionnaire	Their presence in the community
		Community members	Interview Focus group discussion	The awareness of community health needs Limited human resource in the community Benefit to the community Medical students serve as role model to the youth
Ghana	Amalba et al., 2016	Medical students	Questionnaire	More than 60% of students indicated role model during COBES could influence their practice location Over 51% of students indicated it could affect their choice of specialty.
Nigeria	Omotara et al., 2004	Community leaders	Focus Group Discussion	Positive impact in community health, increased community awareness of preventive aspects of diseases
Uganda	Chang et al., 2011	Medical students Faculty Site tutors	Internet based survey	More than 50% of students indicated a likelihood of working in the rural area after graduation Tutors and faculty also generally believed that the COBES program would encourage students to work in a rural setting in the future
Uganda	Kizito et al., 2017	Medical, Pharmacy Dental students Nursing	Questionnaire	A change in students' attitude towards working in the rural areas after COBES. COBES has the potential to increase the number of graduates willing to work in the rural area Students are less influenced by the availability of social amenities after COBES placement

Table 7.1 (continued)

Country	Reference	Study Population	Data collection methods	Key findings
Uganda	Atuyambe et al., 2016	Health workers	Key informant interview	Students contribute to health service delivery at the health facility
		Community members	Focus Group Discussion	Students contribute to health service delivery at the community level Addressing human resource gaps in the community.
Uganda	Wakida et al., 2015	Medical students	Questionnaire	Students with prior rural exposure expected to do community engagement Developed interpersonal skills, lifestyle practices and clinical skills
Uganda	Kaye et al., 2010	Medical graduates Nursing graduates	Questionnaire	Acquired essential skills for rural practice Challenges (inequitable and poor remuneration, Inadequate equipment and supplies, limited opportunity for career progression, Limited access to continuous professional development).
Uganda	Mwanika et al., 2011	COBES Alumni	Focus Group Discussion	Alumni attaches premium on COBES contributing to the development of team work, communication skills,
		Doctors	Telephone questionnaire	competence in primary healthcare willingness to work in the rural area. 86% of Alumni were willing to work in the rural area and it was COBES that affected their willingness to do so. Study provides evidence which strongly points to the possibility that the positive impact of COBES endures with the alumni into the post-university years
South Africa	Iputo JE, 2008	Medical students	Intervention study	Increased numbers of South African black doctors who graduated, Attrition for black students dropped from 23% to <10%
		Graduates		Preliminary research showed that 36% of graduates practice in small towns and rural settings
South Africa	Reid et al., 2011	Medical practitioners	Structured questionnaire	Respondents reported that their experience as undergraduates of the community-based health care and rural situations influenced their decision to practice where they do now. The medical practitioners indicated that their rural experience was meaningful and enjoyable.
South Africa	Dambisya, 2003	Medical students	Questionnaire	Preference to work in the rural areas is strongest among first year students and least among sixth year students.
South Africa	Wilson et al., 2009	Review	Literature search	Moderate evidence that rural exposure as part of clinical rotation in the rural settings influence medical students to consider rural Practice
D. R. Congo	Longombe, 2009	Graduates		The study provides evidence that rural-located medical schools can increase the distribution of practising Physicians to rural areas in Democratic Republic of Congo.

Table 7.1 (continued)

Country	Reference	Study Population	Data collection methods	Key findings
Tanzania	Kapanda et al., 2016	Medical students	Self-Administered Questionnaire	80% of the students were satisfied with the peripheral rural rotation Majority of the students had positive attitude towards peripheral hospital placement.
Botswana	Arscott-Mills et al., 2016	Medical students	Questionnaire semi-structure interview	Most desire urban practice in a public institution or university Rural training did not influence preferred future practice location

Eleven studies were in the PBL/COBES curriculum context and six involved the innovative training curriculum incorporating rural outreach programmes or rural rotation. Nine of the studies looked at students' perceptions of the usefulness of COBES or rural outreach programmes and whether it had an influence on them to work in the rural areas after graduation. Six studies looked at medical graduates' place of work and what influenced them to choose their current place of practice; one was of community leaders' perception of rural outreach programmes and one study was a literature review looking for evidence of rural exposure and the willingness of graduates to take rural postings.

Over 60% of students perceived COBES to be useful as the exposure helped them acquire essential communication, interpersonal and clinical skills relevant for rural practice. Between 60-80% of students indicated they will choose to work in the rural areas after graduation. Alumni of institutions using the PBL/COBES and rural outreach curricula attached premium on COBES contributing to the development of their team work, building competence in primary healthcare and also, that their current practice location in the rural areas was greatly influenced by their COBES experience.

Discussion

We undertook this review to address an important issue of the role of COBES in tackling the maldistribution of doctors in the rural areas in Africa. One of the key strategies to solving the disparities of rural-urban workforce mal-distribution is by providing the opportunities for students to have part of their medical education training in the underserved communities. The ultimate aim of health education is to improve health outcomes. One of the strategies to improve health outcome is to increase access to quality health care across different population groups. The disparity of the distribution

of health professionals between the rural and urban populations can contribute to differences in health outcomes.

There has always been a mismatch between health professions education and the needs of the local health system globally. There is also pressure on medical education to become socially accountable. In Africa, attention has, therefore, been focused on medical education and retention of medical doctors. The most commonly reported strategies to improve retention of both health and non-health professionals include increasing salaries for workers, strengthening post graduate education and launching or strengthening community-based education.[14] A study by Snow et al, 2011[15], on the key factors leading to reduced recruitment and retention of health professionals in remote areas of Ghana indicated that strategies to increase recruitment and retention of health professionals in remote areas for medical schools would be to include compulsory students' rotation in the rural areas. This would help alleviate the fears such as of lack of social amenities, poor road and transportation network and poor accommodation among medical students (often from the urban areas), increase their rural exposure and their understanding of actual conditions in the rural areas.

Given the gaps in human resources for health especially in the rural areas and lower levels of service delivery in Africa, students' contributions to health delivery at facilities and in communities are bridging the gaps in services at the primary health care level. The shortages of health workers, the limited opening hours of health facilities, the long waiting time, unfriendly staff attitude and poor relationships between the community and health staff hinder access to basic health services. Undergraduate medical students therefore, can contribute through COBES to overcoming these barriers and potentially make an impact in health services delivery in the rural communities.[16]

Many medical schools globally, including medical schools from African countries, have scaled up their rural components in the undergraduate curricula, thus responding to changes in health and making medical education more relevant to the needs of rural communities.[17] Changes such as decreasing disease, increasing knowledge on health, improved health seeking behaviour, and increasing primary prevention and primary health care[6,18,19] are seen as the benefits accruing for rural communities as students interact with community members. This will empower the communities to handle their own health needs and serve as a platform for communities to advocate for better health services.[20] Structured community exposure and community-based education has provided health profession students such as medical students with experiences of working with underserved populations and has improved the graduates' preparation to deal with national health problems.[21]

In contrast to the above, there is no evidence that salary increment and other financial inducements have help with the recruitment and retention of health workers especially doctors in deciding the place of future practice.[22,23]

The evaluation of COBES/rural outreach programmes from the perspective of the community and the perspectives of alumni, faculty and students suggest that improvement of poorly equipped health facilities, students' preparation, conduct and supervision of community exposure programmes by medical schools will make rural communities more attractive to health workers. There is enough evidence to suggest that medical schools need to standardise COBES objectives, implement structural adjustments and encourage policy makers to invest in the development of COBES programmes to yield more productive, efficient and better community-based interventions in order to produce a healthcare workforce that is equipped with public health skills to work in rural areas.[18]

Furthermore, evidence emerging across Africa to suggest that COBES not only has a perceived influence on students' willingness to work in the rural communities after graduating, but graduates have also indicated that the undergraduate COBES experience influenced their present practice location.[7,23-27] Training medical students within a traditional curriculum without including any rural outreach programmes with the expectation that they would nevertheless opt to work in the rural area is unrealistic and unlikely to happen under any circumstances.[28] There is evidence from studies from countries in Africa, such as Tanzania[29], Botswana[30], Democratic Republic of Congo[28], Uganda[31-35], D.R. Congo[36], South Africa[23,37,38] and Ghana[39,40] (Amalba et al, unpublished) which indicates that an innovative curriculum involving PBL/COBES that incorporates rural outreach programmes, positively affects students' eventual practice location. It is based on this evidence that the Medical Education Partnership Initiative (MEPI), sponsored by the US government, is supporting 25 medical schools in 12 African countries to increase the quality, quantity and retention of physicians in underserved areas. The MEPI programme will identify strategies within community-based education that are reproducible, scalable and also can optimize outcomes that will be instructive for health professions training programmes across the continent.[41] The search for solutions to this global problem has been central to the policies of many governments and stakeholders in health professions education. Policymakers and curricula planners should learn from the evidence emerging from COBES and acknowledge that the establishment of COBES and rural outreach programmes as part of health training institutions' curricula to provide rural exposure for students will positively influence doctors to choose rural practice. This will help to address the rural-urban disparity in the distribution of doctors. Policymakers should realise that exposing medical students to the rural areas during their period of training as doctors is worthwhile and deserves

the extra resources that it demands as a strategy in addressing the inadequacy of doctors in the rural areas.

Limitations

Common to most systematic reviews, it is possible that some medical schools in Africa that use PBL/COBES or rural outreach programmes aimed at addressing the shortages of health workers in the rural communities in Africa have not been identified. However, we believe that a comprehensive search to include most schools with such curricula addressing rural-urban disparity of health workers was performed. Again, due to the paucity of published studies showing evidence of the impact of COBES/rural outreach programs, we could not assess the structural strengths and weaknesses of such interventions in Africa, although the individual studies provided useful insight. Future studies should focus on the design and methodology to ascertain the strengths and weaknesses of each study regarding the impact of COBES/rural outreach programmes on health workers willingness to work in the rural areas in Africa.

Conclusion

This review reveals that there is increasing evidence that COBES and rural outreach programmes are making an impact on health services delivery in the rural areas. Also, there is growing evidence that exposure of health professions students, especially medical students, to the rural areas influences their eventual choice to work in the rural areas after graduation. Graduates of institutions that incorporate COBES and rural outreach programmes have testified that their present practice location in the rural communities was influenced by the undergraduate rural exposure through COBES. We, therefore, strongly recommend that COBES/rural outreach programmes should be made part of the undergraduate medical curricula in all health training institutions in Ghana in particular, and the sub-Saharan African sub-region in general.

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Chapter 3

The perceived usefulness of community-based education and service (COBES) regarding students' rural workplace choices

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Abstract

Background

Community Based Education and Service (COBES) are those learning activities that make use of the community as a learning environment. COBES exposes students to the public and primary health care needs of rural communities. The purpose of this study was to investigate students' perceived usefulness of COBES and its potential effect on their choice of career specialty and willingness to work in rural areas.

Method

A mixed method cross sectional study design using semi-structured interviews, questionnaires, and focus group discussions were used for health facility staff, faculty and students and community members.

Results

One hundred and seventy questionnaires were administered to students and 134 were returned (78.8% response rate). The majority (59.7%) of students were male. Almost 45% of the students indicated that COBES will have an influence on their choice of career specialty. An almost equal number (44%) said COBES will not have an influence on their choice of career specialty. However, 60.3% of the students perceived that COBES could influence their practice location. More males (64.7%, n=44) than females (57.8%, n=26) were likely to indicate that COBES will influence their practice location but the differences were statistically insignificant (p=0.553). The majority of students, who stated that COBES could influence their practice location, said that COBES may influence them to choose to practice in the rural area and that exposure to different disease conditions among different population groups may influence them in their career choice. Other stakeholders held similar views. Qualitative data supported the finding that COBES could influence medical students' choice of specialty and their practice location.

Conclusion

Medical students' 'perceptions of the influence of COBES on their choice of career specialty were varied. However, most of the students felt that COBES could influence them to practice in rural locations.

Background

Community Based Education and Service (COBES) are those “learning activities that use the community as a learning environment, in which not only students but also teachers, members of the community, and representatives of other sectors are actively engaged throughout the students' educational experience”.[1] COBES exposes students early in their training and throughout their education to the public health and primary health care needs of rural communities. COBES aims to create awareness among students of the importance of developing community partnerships as a means to implement sustainable healthcare initiatives.[2]

Community partnerships are defined as "groups working together with shared goals, responsibilities and power to improve the community".[3] The community partnerships in COBES include those between community members, governmental and non-governmental organisations, students, faculty members, and health facility staff. By building partnerships between the university, service providers and community as well as the students' learning and service activities, COBES positively influences and prepares students to care for people in the rural communities.[3] As students work with local, rural health workers and community members, the relevance of COBES and importance of working in rural areas may become internalised as a result of their interaction with these stakeholders in the community.[2,3]

The migration of doctors and other healthcare professionals in Ghana towards the cities and the so-called problem of cross border brain-drain continue to deprive the country of modern health care

Thus, attention has now been focused on education and retention of medical doctors in Africa. The most commonly reported strategies to improve retention include increasing salaries for faculty, strengthening post-graduate education and launching or strengthening community-based education programmes.[4] There is some evidence that Community- Based Education and Service (COBES) and Problem-Based Learning (PBL) can be used to prepare and acclimatise healthcare professionals to work in rural areas and bring equity in the distribution of health professionals to benefit rural communities.[5,6] Structured community exposure and community-based education provide students with experiences of working with underserved populations and also improve graduates’ preparation to deal with national health problems.[7]

Using the community as a learning environment is compatible with existing learning theories. In this regard COBES can be considered as situated or contextual learning. Contextual or situated learning (also known as situated cognition), or distributed learning refer to situations in which learning and thinking are influenced by the physical and social contexts in which people are immersed. Learning should not be simply

viewed as the transmission of abstract and de-contextualised knowledge from one individual to another, but as a social process whereby knowledge is co-constructed.

However, what are stakeholders' perceptions about the usefulness of COBES for students? Do their attitudes, opinions and associated behaviours have any potential effects on students' willingness to work in rural areas and thereby influence career choice? Since these aspects have not been subject of prior studies, this study explores the perception of the different stakeholders regarding the usefulness of COBES as a means to attract students to work in rural communities, and influence students' place of work and choice of specialty.

Context and methods

National context: Ghana

Ghana, located on the West Africa Coast, is a developing country in sub-Sahara Africa with approximately 25 million inhabitants. Africa has only 3% of the world's health workforce of 59.2 million, despite bearing 25% of the global burden of disease.[8,9] About 70% of the Ghanaian population live in semi-urban and rural areas (which include most part of Northern Ghana). Ghana is one of the 36 countries in sub-Sahara Africa with a critical shortage of health staff. It has four medical schools which graduate approximately 600 doctors annually.[10]
However, despite the graduation of these doctors, national mal-distribution of these, relatively limited number of graduates, migration towards the cities and the so-called problem of cross border brain-drain continue to deprive the country of modern health care.[10]

Local context, Tamale: COBES

The University for Development Studies, School of Medicine and Health Sciences (UDS-SMHS), established in 1996, is one of the four campuses of UDS and located in Tamale. Tamale is the capital town of the Northern Region, one of the ten regions in Ghana.
In 2007, the UDS-SMHS changed its traditional medical training curriculum to a Problem-Based Learning and Community-Based Education and Service (PBL/COBES) methodology in response to international changes in medical education.
In the COBES component of the PBL/COBES curriculum of UDS-SMHS students are exposed to the community from year one of their medical programme. On yearly basis students spend four weeks in the community with pre-defined objectives until year four. In year five and six, they are scheduled for community posting at district hospitals.

Each of the communities to which the students are sent has a health facility. Students are sent to the selected communities in groups of 10, where they subsequently live, learn and provide service. Each year the students go back to the same community but with different objectives. Currently the UDS-SMHS operates in five (5) districts in the Northern region of Ghana. In each district 3-4 communities are selected for students posting. In addition to the availability of health facilities, communities are selected based on the availability of accommodation and portable water. The presence of electricity in the community is not a pre-requisite but considered a bonus if available. An assigned district supervisor, who is a faculty member, visits these communities to supervise the activities of the students and also meet with staff at the health facilities, the chief and opinion leaders of the community

Methods

Participants

The participants of the study included community members, health facility staff, lecturers and medical students as stakeholders of COBES. Inclusion criteria for community members were being older than 18 years of age, being an opinion leader (assemblymen who are the local political leaders for the communities, youth leaders, women leaders' advocates and religious leaders) and having lived in the community for the immediate past 5 years. Medical students who have been to the community for at least two COBES sessions of 4 weeks duration for two consecutive years were eligible to participate. Only medical students in medical year three and four met the inclusion criteria. Medical year two was excluded from the study since they had been to the community only once. From medical year five, students are sent to the district hospitals for COBES which has a different focus. Health facility staff who have worked and interacted with students at the facility level for at least one year were also eligible to participate in the study. A multistage random sampling process was used to select four (4) districts and then two communities (from each of the four districts). UDS-SMHS operates in five (5) districts in the Northern region of Ghana. In each district, 3-4 communities have been selected for students posting based on agreed criteria. For the purposes of this study we randomly selected 4 districts through the use of lottery. After selecting the four districts, a similar simple random process was adopted again to select 2 communities from each of the randomly selected districts.

Lecturers with prior involvement in COBES activities were qualified to participate in the study. Lecturers were considered to have been involved in COBES if they had supervised students as district coordinators or participated in the assessments of

students during COBES. The purpose of the study was clearly explained to all participants (i.e. community members, health worker, students and lecturers) and informed consent was obtained before participation. Translation of interview guide into the local dialect was done for community members who could neither speak nor write in the English Language. Participation in the study was voluntary and confidentiality and anonymity were ensured. Participants were reimbursed the cost of transportation and lunch was provided as a form of incentive. Ethical approval was granted by the Ethics Committee of the School of Medicine and Health Sciences, University for Development Studies.

Data collection tools

This study adopted open-ended questionnaires, focus group discussions and key informant interviews to collect data.

Questionnaire

Data from 10 lecturers and 134 students was obtained using nine open-ended questions with ample space for narrative comments. The demographic variables age and gender were included in the questionnaires (see appendix 3.1). Items of the questionnaire and the focus group discussion guide were derived from review of the literature and through discussions among the authors and other relevant subject area experts. The subject area experts reviewed the items for content validity. The items were piloted on a sample of ten participants (5 from each year group) to ensure that they were comprehensible by the study participants. There were minor changes in the form of editing the English. These ten participants did not take part in the study.

Focus group discussions

Focus group discussions (see appendix 3.2) were used for the community members to collect shared understanding and collective opinions or views on a particular issue rather than individual views. In all 16 focus group discussions were undertaken (8 for male and 8 for female) and each had duration of about 90 minutes. Each focus group had 8 members with each group having either only females or males. This was done to enable women feel comfortable to express their opinions. Culturally, women do not engage in debates with men on contentious issues at the community level. Discussants were selected through purposive sampling. With the aid of a discussion guide, all discussions were done by four trained research assistants having prior experience in conducting focus group discussions. During discussions, the research assistant probed

further for either details of information or clarification of issues for better understanding

Key informant interview

Using an interview guide (see appendix 3.3), key informant interviews were used for health facility staff to get their opinion regarding the relevance of COBES to them and how they think COBES could influence the practice location of medical students. These interviews were carried out by trained research assistants. Using an interview guide the interviewer also probed further for more detailed information.

Data analysis

All quantitative data was analyzed using Statistical Package for Social Sciences (SPSS) version 18 (SPSS Inc, IBM, Chicago, IL, USA) Descriptive statistics of frequencies and percentages were used to describe the data. Data was compared using Fisher's exact test at p-value of <0.05 considered statistically significant.
All interviews and discussions were audiotaped and transcribed verbatim. Data analysis was done in phases according to generally accepted coding principles including open coding, axial coding and selective coding (Cohen, 2007). The initial coding and development of categories was done by the first author (AA). Coding was checked by the third author (VM) who has had some training in qualitative research. The first and second authors (AA, WvM) thereafter checked the coding and resulting categories. Any discrepancies in the process were discussed until consensus was reached.

Results

This section consecutively discusses the numerical results of the questionnaires, the results of the qualitative analysis of the focus group discussion (FGD), questionnaire and guided interviews (see appendices 3.2 and 3.3 respectively). The qualitative results from the separate research tools are thereafter aggregated due to revealed overlap of the results. The resulting main overall results are presented in subsequent sections. Appropriate quotes from the different groups are cited to illustrate the main themes.

Quantitative results of the student questionnaire

From the 170 questionnaires administered, 134 were returned (78.8% response rate). Majority (59.7%) were male. 59% and 41% of the students were in medical year 3 and 4 respectively (see Table 3.2). Thirty and 17 students in years 3 and 4 respectively did not

specifically answer the questions on: “will your experience in the community through COBES affect your choice of specialty’?” And ”how will your experience in the community through COBES affect your choice of practice location?”’ These were considered as missing values and therefore were not used in the analysis of these two specific questions. They however answered other questions in the questionnaire that addressed other aspects of the research question. Almost 45% of the students indicated that COBES will have an influence on their choice of career specialty, while an almost equal number (44%) said it will not have an influence on their choice of career specialty (shown in Table 3.1). However, 60.3% of the students perceived that COBES could influence their practice location. Although a high proportion of females indicated that COBES could not influence their choice of specialty, the differences were not statistically significant using Fisher’s exact test. More males (64.7%, n=44) than females (57.8%, n=26) were more likely to indicate that COBES will influence their practice location but the differences were statistically insignificant (p=0.553).

Table 3.1 Students’ reported perceived influence of COBES on choice of career specialty and practice location stratified by gender

Variable	Total	Male	Females	p-value
Choice of career specialty	(n=105)	(n=65)	(n=40)	
Influences	47 (44.8%)	29 (44.6%)	18 (45.0%)	1.000
Does not influence	46 (43.8%)	29 (44.6%)	17 (37.8%)	0.843
Uncertain	12 (11.4%)	7 (10.8%)	5 (11.1%)	0.764
Missing (n=29)		(15)	(14)	
Practice location	Total (n=116)	(n=68)	(n=45)	
Influences	70 (60.3%)	44 (64.7%)	26 (57.8%)	0.553
Does not influence	41 (35.3%)	24 (35.3%)	17 (37.8%)	0.694
Uncertain	5 (4.3%)	3 (4.4%)	2 (4.4%)	1.000
Missing (n=18)		(9)	(9)	

Shown in Table 3.2 are students’ perceived influence of COBES on their choice of specialty and practice location, stratified by level of medical training. Significantly, students in medical year three were more likely than their counterparts in medical year four to report that COBES will influence their choice of career specialty (54.2% vs. 32.6%; p=0.031) and practice locations (69.6% vs. 46.8%; p=0.020).

Although the results are presented in an aggregated way due to large commonalities in response, there was one peculiar difference in response that came solely from the health facility staff in terms of support for training.

Table 3.2 Students' reported perceived influence of COBES on choice career specialty and practice location stratified by level of medical training

Variable	Medical year three (n=79)	Medical year four (n=55)	p-value
Choice of career specialty	(n=59)	(n=46)	
Influences	32 (54.2%)	15 (32.6%)	0.031
Does not influence	23 (39.0%)	23 (50.0%)	0.323
Uncertain	4 (6.8%)	8 (17.4%)	0.124
Missing (n=29)	(20)	(9)	
Practice location	(n=69)	(n=47)	
Influences	48 (69.6%)	22 (46.8%)	0.020
Does not influence	18 (26.1%)	23 (49.0%)	0.017
Uncertain	3 (5.1%)	2 (4.3%)	1.000
Missing (n=18)	(10)	(8)	

Qualitative results

The qualitative results of the Focus Group Discussions, questionnaires and guided interview analysis are presented based on subjects/themes that were identified from the different research techniques used. Consecutively, how COBES is perceived to influence choice of specialty and practice location, benefits of COBES to the community and to the students will be discussed, finalizing with suggested future improvement of COBES. Illustrative quotes are provided in italics.

How COBES could influence students' choice of specialty

Participants indicated that the decision to make a choice on which areas students specialise is influenced by various factors including: the awareness of the needs of the community, the inadequacy (both in numbers and levels of professional training) of healthcare personnel or doctors in the rural community, the right of the rural person to healthcare and the exposure to different fields of medicine. It becomes clear that the community's lack of basic access to healthcare may motivate some of the students to want to fill this gap after their graduation. As shown in the results in Table 3.1, almost 45% of the students indicated that COBES will affect their choice of specialty with more males indicating so.

> *'Most surgical patients have to be referred to Bole (district hospital), and patients lose their lives when the only surgeon in Bole is busy or is not around, hence I will like to be a surgeon'. (Male student)*

Early patient contact during COBES exposes the students to various disease conditions, and also allows them to work under various health professionals in the community.

They get the chance to practice some of the skills learnt in the skills laboratory at the faculty on real patients. This gives them the opportunity to identify areas of interest to want to specialise.

> *'I got the opportunity to assist in delivery of a baby and that gave me an interest in O & G' (Female student)*

How COBES could influence students' practice location

The willingness and preference of students to work in the rural area is not only due to their mere presence in the community but also due to awareness of community health needs and the limited human resources. These are pull factors for students to want to work in the rural area.

> *'The communities have so many health problems with less experienced health professionals. So I will prefer to work closer to these communities' (Male student).*

The student's adaptation and adjustment to rural lifestyles make them to cope with living in the rural community. COBES develops students to adapt to rural lifestyle making it easy to accept to work in rural communities. This is evident by the following quotes.

> *'If I am able to stand the challenges during COBES, I don't think there will be any other community I can't work in or survive. Hence, I will accept posting anywhere' (Female student).*
> *'Through COBES students are already exposed to the rural communities. They may appreciate the settings and thus accept rural postings as practice location' (A lecturer).*

During COBES the students realise the need for equity in health care; that health is not the preserve of the affluent in the cities but that the poor rural people also have the right to quality healthcare.

> 'COBES *makes me realise that the poor also needs better health, has encouraged me to work to reach out to the poor and needy in the way I can' (Male student).*

The welcoming reception and hospitality the community members' accorded to the students may be a motivating factor for graduates to go back to the community to practice especially when the students see the societal benefits in preventing diseases in the community. This is made obvious by the following quote.

> '*I would gladly accept posting to my COBES community or a similar community due to the warm reception received and the hospitality of the people' (Male students).*

Benefits of COBES to the community

The study participants cited a number of benefits to the community.

Health education and promotion

The community sees the relevance of health promotion and education. As the students give talks on health education and carry out health promotion activities, the behaviour of the community, as well as their health seeking behaviour changes and their awareness towards health and their knowledge on health issues improve.

> *'It has improved their way of living especially health-wise. Pregnant women have also known the importance of antenatal and postnatal care' (Female student).*

Serves as role model to the youth

The presence of the students in the community serves as motivation for the youth. In the northern part of the country where most families do not see the relevance of children's education, parents do not invest in their education. Encountering female students may convince parents that educating the female offspring can be very rewarding, as evidenced by the following quotes.

> '*Motivates the young ones in the community to take their studies more serious since they may see them(students) as role models and therefore aspire to be like them' (Lecturer).*

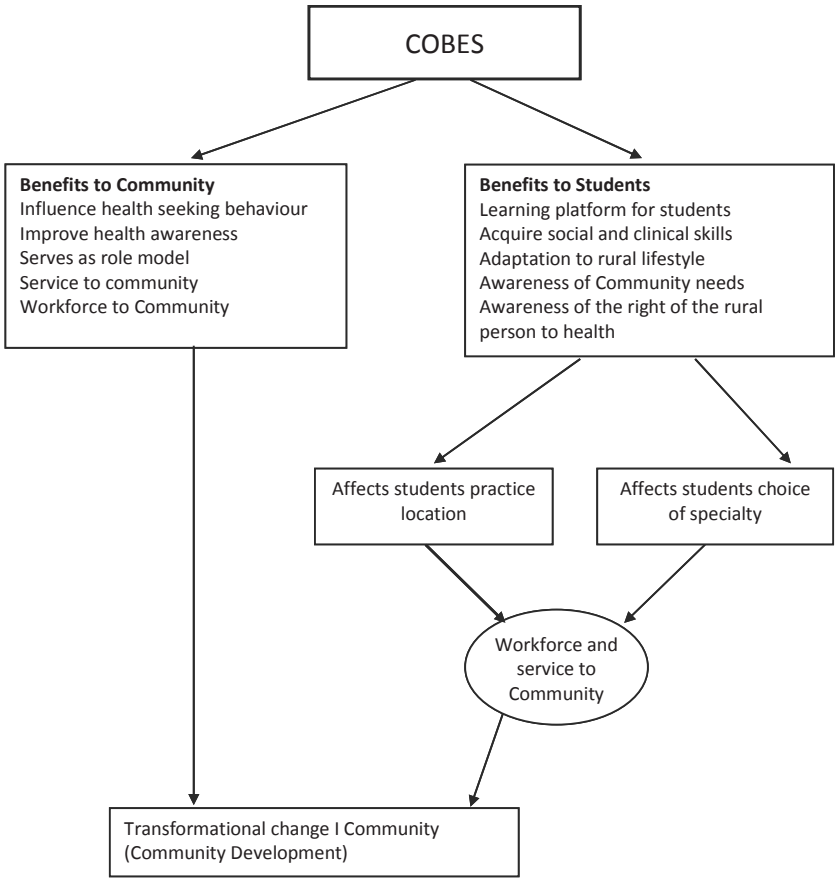

Figure 2.1 Benefits of COBES

Service to the community

Participants indicated that the presence of students in the community provides workforce to the community. They are also able to identify the needs of the community and propose solutions with the support of the community members.

> *'Students solve basic community problems. Students provide services to the community. Members of the community learn positive lifestyle from the students' (Male student).*

Benefits of COBES to the students

Participants alluded to the fact that students do benefit a lot from COBES activities in the communities. Stakeholders acknowledged that the community serves as a learning platform where students interact with people of different cultural backgrounds. This helps them improve their communication skills, help to build their clinical and social skills and empowers them in their clinical work. COBES helps students get a clear understanding of primary health care setting within the health structure. Having part of their training in the community helps them to make choices as to which areas they want to specialise and also develop interest to practice in the rural area after graduation.

> *'As a result of COBES some students develop on interest in practicing in rural areas after graduation' (Male student).*

> *'When in school they only learn what is in the book but when they come here they can apply what they have learnt and by this they gain more experience. They see diseases and symptoms in books but as they come here to see people with these health conditions in the community and how these illnesses have changed the physical outlook of these people. He or she can observe the clients much better than as learned in the books. This can enhance their knowledge' (A community youth leader).*

Training support from University

Some of the health facility staff were of the opinion that since most of those who guide the students in the community are community health nurses, the University, as a way of incentive, could offer some of them admission into the University to pursue further studies to better guide the students who are more knowledgeable than them.

> *'Though the community health nurses have some experience, we will need further training in the University to better guide the students,------- otherwise the way it is instead of we guiding the students, they would be teaching us' (Community health nurse).*

Suggestions to improve the organisation of COBES in the future

Participants indicated a number of 'push factors' that if addressed would go a long way to improve the organisation of COBES to increase students interest of practicing in rural communities when they graduate. Students suggested that both past and present

students should be involved in the planning committee of COBES for better organisation of the programme. The lack of basic equipment at the facility level was de-motivating and called for improvement of the poorly equipped health facilities. It was suggested that intervention proposal written by the students and the community should be made available to the NGOs and District Assemblies to solicit for funds to address some of the identified community needs so as to improve their social amenities. Staff and lecturers should be motivated to spend adequate number of days in guiding the students in the communities.

Discussion

This study revealed that about 45% of the students indicated that COBES will influence their choice of specialty. Though an equal number had a contrary view of the effect of COBES on their choice of specialty, educational experiences in the community may influence the choice of specialty of medical students. As shown in the study, students cited a number of reasons why COBES could influence their choice of specialty. Being confronted with the needs of the community such as inadequate health professionals, different disease conditions as well as different specialities of medicine were some of the reasons observed by students. These experiences may motivate students to choose certain areas of medicine to specialise in. A desire for rural practice is an important factor in the choice of rural primary care as a career.[11] It is however, noteworthy that about 44% of the students did indicate that COBES will not influence their choice of specialty. This probably suggests that students may not be satisfied with certain aspects of the COBES program. As suggested by the students and other stakeholders, structural improvement in the organisation of COBES such as improved transport arrangements, accommodation, equipped facilities, the presence of doctors may influence the decision regarding the choice of specialty and practice location of such groups in future. An important finding of this study was that majority of the students (60.3% vs. 35.3%) said their experiences during COBES may influence their practice location and as evidenced by our qualitative data, most of these students indicated their willingness to practice in rural areas. This is supported by similar studies in South Africa[12] and Uganda[2] which indicated that the decision to 'go rural' is not automatic, but is seemingly facilitated by other factors such as awareness of the needs of the rural area, role modelling, and exposure to rural training. The importance of this finding is that there is some evidence that Community-Based Education and Service (COBES) can be used to prepare and acclimatise healthcare professionals to work in rural areas and bring equity in the distribution of health professionals to benefit rural communities.[5,6]

The Ghana Ministry of Health (MoH) has implemented a number of incentives aimed at limiting the migration of doctors and other health professionals in Ghana towards the cities and the so-called problem of cross border brain-drain which continue to deprive the country of modern health care[[10]]. These incentives included a 20-30% salary top up for health staff in deprived areas (implemented in 2004) and a staff vehicle purchase scheme (implemented in 1997).[13] However, neither has yielded the desired results in addressing the lack of health professionals in remote areas. Wilson and Couper[14] described coercion as forced redress where penalties are applied if doctors do not comply with certain requirements like 'community service,' requirement to register as a doctor, rural experience required prior to further specialisation and limiting foreign health professional recruitment to rural practice.[14] In Ghana however, rural experience as a requirement prior to registration as a medical doctor or further specialisation is not a requirement.

Therefore, attention must be focused on structured community exposure and community-based education to provide students with experiences working with underserved populations and improve graduates' preparation to deal with national health problems.[7] A sense of social responsibility develops among the students as they interact with community members.

Using the rural community as a platform to prepare graduates to work in rural communities is consistent with similar studies in Uganda,[15] Canada, and Australia.[16]

A positive rural practice experience during medical school can positively influence students' attitudes towards rural practice and eventual practice location in rural areas.[17-22] According to Kaufman et al.[23] rural training sites are ideal locations for students to confront the array of social, political and economic forces underlying ill health in our society. Exposing students to an environment that 'typically resembles' what students will encounter in later professional life helps them to be acclimatised to the harsh conditions which builds them up to face future challenges and also changes their mind-set of community life. They see the community as a learning platform which is compatible with existing learning theories that is contextual or situated learning.

As shown in the model diagram (see Figure 2.1) continuous presence of students in the community brings a lot of benefits. These include improved quality of health services, helping to carry out community projects, serving as role models to the youth. This eventually leads to community development/transformation.

Transformative learning derived from the works of education theorists, notably those of Freire[24] and Mezirow[25] have three successive levels-moving from informative to formative to transformative learning. During COBES, students start from the informative level by acquiring knowledge and skills. Through socialising students

around values and attitudes they move to the level of formative learning. Finally, students move to transformative learning when students develop leadership attributes with the aim of making them become enlightened change agents.[26]

A welcoming reception and hospitality by the community members' may be a motivating factor for graduates to go back to the community to practice. This may be influenced by students realizing the social benefits of preventing diseases in the community. This has been similarly reported by Couper et al.,[27] in South Africa in which it was revealed that a close relationship with the community, appreciation and a sense of acceptance by the community are reinforcing factors for graduates to choose rural placement. It is important to identify and encourage role models in the rural community as they have greater influence on career choice in primary health care and this is an important principle in future health professional provision. The importance of role models in influencing career choice has been similarly reported in other studies in sub-Sahara Africa.[27]

Another important finding of this study was that, students in medical year three were more likely than students in medical year four to say that COBES may influence their choice of practice location. This is unexpected, as we anticipated students to develop more interests to working in rural communities as they progress in the program. Probably students in medical year four observed that the current form of the COBES program may not be meeting its objectives and may have to be revised. Students observed several challenges with the current form of COBES including poorly equipped health facilities and inadequate involvement of past students, among others. It's imperative to note that the COBES program is currently undergoing a review to take care of the challenges identified by the students and other relevant stakeholders.

Despite the challenges cited by students and other stakeholders in this study, both students and community members expressed satisfaction with the programme and its likelihood of influencing students to work in the rural area after graduation. This has been similarly reported in other studies.[28,29]
For future improvement of the COBES programme, students, community members as well as lecturers identified a number of educational and social challenges such as: lack of professional development, poorly equipped health facilities, lack of accommodation, bad road network and inadequate transport system to move within the community, which if adequately addressed would provide a more enabling learning educational environment. The University could, for example, lower the entry requirement for admission for the community health nurses, who guide the students, to further their

education as a way of incentive. The challenges or barriers which mitigate against students practice location after graduation and as such serves as major barriers to healthcare capacity building is not limited to Ghana alone but these barriers have been similarly reported in studies across sub-Sahara Africa.[4,7,28] The Ghana Ministry of Health (MOH) and Ministry of Education (MOE) could begin to initiate pilot interventions especially educational reforms such as launching or strengthening COBES aimed at improving retention of health workers in deprived/hardship areas based on available evidence.

Limitations

The present study has limitations. The students who participated in the study were third and fourth year students who had participated in COBES activities at least for two consecutive years. Their views and perceptions may change as they progress along the academic career and after graduation. The views of the graduates were not included in this study.

The study was carried out by staff of the School of Medicine and Health Sciences, most of who have the passion and positive attitude towards COBES and this might have created some bias. However, an attempt to prevent this was our use of a questionnaire with open ended questions and probing into rationales where necessary. Furthermore, the survey was conducted in a single Ghanaian medical school, making it difficult to generalize our findings. However, the findings are in agreement with similar studies conducted in both developed and developing countries. It also serves as a baseline for further studies in other medical schools in Ghana.

Conclusion

Medical students 'perceptions of the influence of COBES on their choice of career specialty were varied. Most of the students however, felt that COBES could influence them to practice in rural locations. Health facility staff, faculty and community members applauded the COBES programme and generally indicated that the COBES programme could encourage graduates to choose rural places to work if a holistic supportive learning environment was provided for the students.

Almost equal proportions of students perceived that COBES could influence their choice of career specialty and practice location. Being aware of the needs of the community such as inadequate doctors or health professionals and the right of the community members to have equal access to health were some of the push factors that could influence students' choice of specialty and practice location. Students' being able to

adapt to rural lifestyle through COBES may also be important in influencing students' choice of career specialty and practice location.

The findings of this study suggests that using the community as a training environment may help to address the inequality or mal-distributions of doctors and other health professionals in the country and other Sub-Saharan African countries in similar circumstances. Future research could be conducted to explore the reasons why students think COBES will not influence their practice location or choice of specialty in order to guide further improvement of the COBES curriculum.

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Appendix 3.1 Students-questionnaire

Introduction

The School of Medicine and Health Sciences (SMHS) of the University for Development Studies (UDS), Ghana, successfully adopted its traditional medical training curriculum to Problem-Based Learning (PBL) and Community-Based Education and Service (COBES) methodology in 2007.

COBES describes those "learning activities that use the community extensively as a learning environment, in which not only students but also teachers, members of the community, and representatives of other sectors are actively engaged throughout the educational experience" (World Health Organization, WHO, 1987). COBES component of the PBL/COBES curriculum of UDS-SMHS is the process by which teaching and learning is done in the community. Students start community exposure from year one of the medical programme and spend four weeks in community and this continues on a yearly bases where the students go back to the same community with defined objectives

Demographic characteristics

Age:

Gender:

Level:

1. How many years have you participated in COBES at UDS-SMHS?
2. What are the opportunities available to students going on rural placement?
3. What would in your opinion encourage students to want to choose a rural placement?
4. What are some of the challenges that you faced during COBES?
5. How will your experience in the community through COBES affect your choice of SPECIALTY?
6. How will your experience in the community through COBES affect your practice LOCATION?
7. How will you describe the benefits of COBES to the community?
8. In what way do you think COBES can be used to develop the interest of graduates to work in the rural area?
9. What would you suggest as a way of improving the COBES activities that will positively influence a rural workplace after graduation

Appendix 3.2 Community-focus group discussion guide

Introduction

The School of Medicine and Health Sciences (SMHS) of the University for Development Studies (UDS), Ghana, successfully adopted its traditional medical training curriculum to Problem-Based Learning (PBL) and Community-Based Education and Service (COBES) methodology in 2007. COBES describes those "learning activities that use the community extensively as a learning environment, in which not only students but also teachers, members of the community, and representatives of other sectors are actively engaged throughout the educational experience" (World Health Organization, WHO, 1987). COBES component of the PBL/COBES curriculum of UDS-SMHS is the process by which teaching and learning is done in the community.

Students start community exposure from year one of the medical programme and spend four weeks in community and this continues on a yearly bases where the students go back to the same community with defined objectives

1. What do you think are some of the factors that will encourage trainees to work in rural communities (personal and community factors)
2. In your opinion, how beneficial is COBES to trainees and rural communities
3. What are the challenges you encountered as a result of the students stay in your community?
4. What will you do as a community to encourage students to come back to your community after graduation?
5. What, in your opinion are the challenges faced by students during their stay in the community?
6. How can COBES be improved for the benefit of trainees and the community
7. Do you think the PBL with COBES has any influence on trainees choice of place of work and how does it influence this choice.

Appendix 3.3 Health workers/district hospitalsinterview guide

1. What would in your opinion encourage students to want to choose a rural placement
2. What do you think would be additional opportunities and benefits of students going on rural placement
3. In what way do you think COBES can be used to improve the interest of graduates to work in the rural area?
4. What would you suggest as a way of improving the COBES activities the will positively influence a rural workplace after graduation
5. What will you do as a facility to encourage students to come back to your facility after graduation
6. What are in your opinion the challenges faced by students during their stay in their communities.

Chapter 4

Community-based education: the influence of role modelling on career choice and practice location

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Abstract

Introduction
Research findings in medical education support the influences of role models on others and the importance of positive role models in enhancing learning and influencing the career path of medical students and graduates. The authors explored the characteristics of positive and negative role models during COBES, as well as their effect on trainees' career paths.

Method
A cross-sectional survey was conducted by means of a questionnaire among medical students to explore the characteristics of positive and negative role models during COBES. Associations between gender, choice of specialty and practice location were assessed using the Chi-square test. All qualitative data analysis was performed using the principles of primary, secondary and tertiary coding.

Results
Majority of the students indicated that role modeling during COBES will affect their choice of specialty and choice of practice location with a significant gender difference in terms of practice location ($p<0.005$). Qualitative data supported the finding that positive role modeling during COBES may influence graduates willingness to work in the rural area.

Conclusion
The desire and willingness to work in a rural community combined with good communication and excellent interpersonal skills as well as good leadership skills are attributes of good role modelling that could influence medical students' career choice during COBES.

Practice points

1. Community-Based Education and Service (COBES) exposes students early and throughout their education to the public health and primary health care needs of rural communities.
2. The use of COBES to influence choice of specialty and practice location in sub-Sahara Africa has so far received limited attention.
3. Positive role modeling in the rural community during COBES may influence students' choice of specialty and practice location.
4. Good role modeling attributes obtained from this study include: working and staying in the rural community, challenging and inspiring trainees during the COBES rotation.
5. Addressing mal-distribution of doctors through COBES program in the sub-Sahara region seems promising.

Introduction

Community-Based Education and Service (COBES) entails "learning activities that use the community as a learning environment, in which not only students but also teachers, members of the community, and representatives of other sectors are actively engaged throughout the students' educational experience".[1]

COBES exposes students early and throughout their education to the public health and primary health care needs of rural communities.

COBES aims to create awareness among students of the importance of developing community partnerships as a means to implementing sustainable health care initiatives.[2] Using the community as a learning environment is compatible with existing learning theories. In this regard, COBES can be considered as situated or contextual learning. Contextual or situated learning refers to situations in which learning and thinking are influenced by the physical and social contexts in which people are immersed. Learning should thus not be simply viewed as the transmission of abstract and decontextualized knowledge from one individual to another, but as a social process whereby knowledge is co-constructed. Learning is situated in a specific context and embedded within a particular social and physical environment and professionals learn from participating in, and gradually being absorbed into, communities of practice.[3] A learning environment exists wherever and whenever students gather and embraces numerous factors that contribute to effective teaching and learning,[4] such as the use of structured experiences, and being supportive and understanding of students needs and aspirations.

Research findings in medical education support the importance of positive role models in enhancing learning and influencing the career paths of medical students and graduates.[5] Medical education as a form of adult socialization is generally characterized by the strong desire of students to acquire the knowledge and skills of the professional role model. To be most effective, learning must be undertaken in an environment that emphasizes a spirit of enquiry, is supportive and understanding of students' needs and aspirations and is characterized by civility and sensitivity to cultural, ethnic, and gender issues as they relate to students, teachers, and colleagues.[6]

Role modeling is deeply rooted in social cognitive theory of learning, where learning is enhanced when students can observe and emulate the thinking and actions of expert role models.[5] Role modeling theory proposes that individuals perceive their identity in relation to those with whom they associate, those who have related roles and are affected by the individual's identity and performance.[7] Studies indicate that role modeling may be positive or negative. When house officers recall their experiences with negative role modeling, they are most likely to regret their choice of medicine as a

career based on these experiences.[8] However, research findings also indicate that positive role models can have a strong influence on specialty choices of students and are important in shaping and reshaping learners' view of their future careers.[9]

During COBES, the students use the community as a learning environment and as they interact with members and health experts in the community, this provides them with real opportunities for role modeling and socialization. When students experience early and sustained exposure to rural communities and to rural physician role models, their perception to practice in rural areas may be influenced.[10] The exposure also provides the students the opportunity to understand health and illness in the rural context. In addition, repeated interaction and collaboration with members of the community creates emotional situations that tend to awaken the civic responsibility of the students toward these rural communities. Furthermore, medical education research indicates the power of a "hidden curriculum," learning that occurs by means of informal interactions among students, faculty, and others, in shaping students' values and behavior.[11] Role modeling of students is more informal and unplanned when students learn from direct observation of skilled doctors.[9,12]

Systematic search of electronic databases indicates that substantial research has been done on role modeling in medical education in general.[13] However, far fewer studies have focused on the influence of role models in COBES especially in developing countries. As students observe the behaviors of the health workers and other civil servants during COBES, they are likely to form their own opinions and reshape their attitudes, and these observations may consequently influence the students in their future career choices. This study therefore explores the characteristics of positive and negative role models in COBES, as well as their effect on trainees' career choices, and their willingness to work in the rural community after completion of their medical education.

Methods

Settings

Ghana, which is located on the West Africa Coast, is a developing country in sub-Saharan Africa with approximately 25 million inhabitants.

The University for Development Studies School of Medicine and Health Sciences (UDS-SMHS), established in 1996, is one of the four campuses of UDS and is located in Tamale. Tamale is the capital city of the Northern Region, one of the 10 regions of Ghana.

In 2007, the UDS-SMHS changed its traditional medical training curriculum to a Problem-Based Learning and Community-Based Education and Service (PBL/COBES) methodology in response to its original mandate of using a problem-based, student-oriented, interdisciplinary, and community-oriented methodology as an approach to teaching medical students.

In the COBES component of the PBL/COBES curriculum of UDS-SMHS, students are exposed to the community from year 1 of their medical program. After a first year of participating in the University-wide interfaculty community based program known as Third Trimester Field Practical Program (TTFPP), the COBES program for medical students starts in year 2 and continues up to year 4. Students from year 2 to 4 are sent to communities with at least a primary health care facility. In each of these 3 years, from July to August, the students spend 4 weeks in the community in groups of 8–10 per community. The COBES curriculum is iterative and each year builds upon the previous years' experience thereby updating, improving, and expanding the activities of the previous year. The curriculum is spiral in nature, that is there is a revisit of topics throughout the course but at different levels of difficulty.[14] Depending on the year of the program, students are expected to identify and explain factors (e.g. demographic, economic, social, cultural, political, and environmental) that affect the community's health (first COBES year), perform a study resulting in a community health diagnosis to identify community health needs, and subsequently prioritize them (second COBES year) and identify the resources available in the community to contribute to solving those needs (third COBES year). At the community level, the students design and implement a health intervention program based on the community health diagnosis. They rotate through the various sections of the health facility in the community, for example the dispensary, consulting rooms, Maternal and Child Health clinic, and the laboratory as well as participate in the scheduled immunizations visits by health workers to the communities.

An assigned district supervisor and a faculty member visit the students in their various communities, interact with leaders of the health facility, the chiefs, and opinion leaders of the communities and evaluate the activities of the students.

Participants and questionnaire

A cross-sectional survey was conducted among third- and fourth-year medical students who followed the PBL/COBES curriculum. In 2014, a questionnaire was administered to a convenient and purposeful sample of 149 students (60 students in year 3 and 89 students in year 4) who were present during their respective lecture sessions. The survey consisted of questions that explored the demographic characteristics of the students, such as gender and age, as well as eight opened-ended questions. The latter

assessed the characteristics of positive and negative role models during COBES, the effect of role models on their choice of specialty and their willingness to work in a rural area. The questionnaire was developed by the first author (A.A.) and construct-validated by the third and fourth authors (A.S. and W.v.M.) who reformulated some of the questions for clarity. The questionnaire was then pretested on five students from each class who made minor changes. These students were excluded from the study.
The purpose of the study was clearly explained to all participants and informed consent was obtained before participation. Participation in the study was voluntary and confidentiality and anonymity were ensured.
Formal permission to carry out the study was given by the Dean of the School of Medicine and Health Sciences and ethical approval for this study was obtained from the Ethics Committee of the School of Medicine and Health Sciences of the University for Development Studies.

Data analysis

The quantitative data were entered into Microsoft Excel and analyzed using GraphPad Prism, Version 5.01 (GraphPad Software Inc., San Diego, CA). Results were presented as frequencies and proportions of the total sample recruited. Associations between gender, choice of specialty, and practice location were assessed using the chi-square test.
Analysis of open-ended questions was performed using Atlas TI version 6.0.15 GmbH-Berlin, in phases according to the generally accepted coding principles of open coding, axial coding, and selective coding[15] based on principles derived from grounded theory.[16] Initial coding was done by author (A.A.), thereafter the first, third, and fourth authors (A.A., A.S., and W.v.M.) checked the coding, and any discrepancies in the process were discussed until consensus was reached. Illustrative quotes from the open-ended questions are presented to underscore the findings when and where applicable.

Results

This section describes the numerical results of the questionnaire and the results of the qualitative analysis of the open-ended questions.

The quantitative results

From the 139 questionnaires administered, 134 were returned (96.4% response rate). The majority of participants (59.7%) were male. A majority of the students indicated

that role modeling during COBES will affect their choice of specialty and choice of practice location with no significant gender difference in terms of choice of specialty ($p<0.09$), but a significant gender difference in terms of practice location ($p<0.005$). However, a significant proportion of males indicated that role modeling would not affect their choice of specialty ($p<0.001$) (Table 4.1).

Table 4.1 Study variables of students stratified by gender

VARIABLE	TOTAL (n=134)	MALE (n=80)	FEMALE (n=54)	P-Value
Choice of Specialty				
Will Affect	69 (51.5%)	40 (50.0%)	29 (53.7%)	0.0900
Will not Affect	21 (15.7%)	16 (20.0%)	5 (9.3%)	0.0017*
Not sure yet	7 (5.2%)	4 (5.0%)	3 (5.5%)	1.0000

The open-ended questions

A number of themes related to role modeling were identified. Most of the students considered good moral and social standing, professional background regarding specialty (that is, for example, being either a pediatrician or a neurosurgeon) and having good reputation among patients as attributes they value in an individual who could serve as a role model. An attribute, by definition, is a commonly central quality or feature of something or someone especially one that is a core part of its nature, a character trait. Quality, however, is a characteristic or feature of someone or something (Cambridge int. Dictionary of English). Students identified the following themes during COBES as qualities they value in a role model.

Personal attributes

Students, in particular, mentioned certain personal attributes of role models that they valued to have an impact on their career paths. These personal skills mainly related to attributes, which the students frequently observed in the community members during their interaction with health workers, community leaders as well as faculty members. The attributes included being: hardworking, God-fearing, disciplined, humble, respectful, and dedicated to the profession, and also being open-minded, honest, responsible, approachable, compassionate, and inspiring.

Hard working role models who stay in the communities and want to improve health delivery without complaining to trainees about how difficult staying in the community is. (Male student, 24 years)

A person who is dedicated to his/her work, respects everyone and is disciplined. (Male student, 22 years)

Easy to approach, dedicated service to everyone, with a good humble heart. (Male student, 25 years)

Teaching attributes

Students identified attributes relating to willingness to teach, having a good understanding of students' learning difficulties, and dedication to teaching, as behaviors students see in excellent role models.

Two sub-themes were identified in the theme "teaching attributes":

a. Responsibility/duty (duty or role as a teacher): Willingness to teach, a good and dedicated teacher. Someone who is hardworking, humble, but firm. A person who is ready to teach, as well as, listen to an expressed opinion. A person who inspires confidence in others. (Male student, 23 years)
b. Supportive (encouraging whilst teaching students): proper understanding of students' learning difficulties. Such a person should be able to educate me, advise me and challenge me to do better. Should be able to encourage me to improve in my weak areas (Female student, 26 years)

Professionalism

The students valued role models, who interacted professionally with patients and students alike, showed compassion for the sick and helped build a professional identity in the medical vocation.

A person who is diligent to duty and service with the aim of helping others and bringing smiles to faces. Someone who puts the life of others as a priority. Someone whose actions show that he's working for the good of this generation and other generations to come; not someone who wants to gain all good things to himself at the expense of others. (Female student, 23 years)

A young or elderly man or woman in the profession with many years of experience who has made an impact in society both through his/her profession and outside of it. (Male student, 25 years)

Professionalism, dedication, passion, hardwork, compassion, modesty, gentle, calm. A person who loves to share his knowledge and experience. (Male student, 22 years)

Role models in the rural community

As to who could serve as a role model during COBES in the rural community, students identified mostly the health workers, leaders such as assembly members, chiefs, youth leaders, some ordinary community members, and faculty members from the University. The students identified the following characteristics as attributes of positive role

models in the rural community: good communication and interpersonal skills, good leadership skills, putting the community's needs first, being sociable and friendly and being a team player, as well as having the desire and willingness to work in the rural community.

From the above description of attributes required in the rural role models, the following sub-themes were identified:

a. Social skills: good communication and interpersonal skills, being sociable and friendly and a team player A person who can relate well with the community members and motivates them to achieve their goals in life (Male student, 22 years) One with good management skills, communication and interpersonal skills (Female student, 23 years)
b. Leadership skills
   A person who is intelligent and has foresight as to what he/she wants to achieve for the community. A dedicated individual (Female student, 22 years)
c. Empathy/compassion: the desire and willingness to work in the rural community, putting the community's needs first.
   Someone who has the welfare of his/her community at heart and dedicates him/herself to making sure that there is development in the community. Someone who is willing to take care of the needs of the vulnerable persons in the community. (Male student, 20 years)
d. Most often the people we see in the communities are community health nurses. I think if more doctors lived in such communities they would help others also make similar decisions. (Female student, 23 years)

Choice of specialty

As attributes that are likely to influence their choice of specialty during COBES, the students mentioned the following: hardworking personality, encouraging and inspiring trainees, being willing to help the community and also being a specialist who actually stays and works in the community.

If the person is a specialist in his field of study and still has chosen to be in the community, I think students will be humble enough to emulate his/her example no matter their level in the field of medicine. (Female student, 23 years)

It can really encourage the trainees because if with little resources the community health workers can do so much to help sustain the health of the community, then with further training the students would want to specialise in a relevant field to help alleviate the burden suffering at the community level. (Male student, 23 years)

Choice of practice location

While in the community doing their 4-week COBES rotation, students identified the following attributes that could influence their choices of place of work: encouraging the trainee, demonstrating a favorable attitude toward work in the rural community, displaying a positive attitude for the community, exemplary behavior, exhibiting profound willingness to work in the rural community, making working and staying in a community attractive to the trainee by his/her mannerism, demonstrating commitment for the job despite challenges, and challenging and inspiring trainees.

A pleasant attitude put up by a role model towards the trainees would make them develop a favourable attitude to working in the rural community. (Male student, 20 years)

If role models have a positive attitude toward work in the rural area it could encourage trainees to also work in rural areas. (Female student, 22 years)

Dedication to work in spite of non-availability of certain facilities/amenities and the ability to improve the lives of community members by a role model can help others adopt to the situation and learn to work in rural communities. (Female student, 22 years)

Barriers to role modeling

The students identified the following attributes as negative elements in a role model, which may consequently adversely impact on their career choices. They included: laziness, arrogance, lateness to work, selfish/self-centered, irresponsible, bad interpersonal relationship, untrustworthy, not courteous, and dishonest.

Lack of morale values that conform to that of the society, A person who is not truthful, not frank. (Male student, 21 years)

Arrogant, proud and insensitive when dealing with people around you; selfish and unloving. A serious looking personality but who is very disappointing in his motivation of others. (Female student, 23 years)

Greedy, self-centred; apathetic to patients, and unwilling to share knowledge; undisciplined. (Male student, 22 years)

Discussion

This study identified a number of qualities students value in persons they observe and perceive as role models during COBES. The most commonly mentioned attributes included being disciplined dedicated, honest, approachable, and inspiring. These

qualities can be grouped under three main themes: personal, teaching, and professional attributes. These findings are supported by previous research about role models in medical education which had identified personal qualities, teaching skills and clinical competence as the critical variables in the choice of role models by medical students.[13] A role model in the medical field helps prepare medical students in their professional career by his/her exemplary teaching and mentoring; this helps shape the students' professional identity, creates awareness of their future professional responsibility and their entry into the workplace as doctors.[13] Regarding role modeling, our findings add a sub-Saharan perspective to the literature of attributes good role models in medical education should have. So far research on the influence of role models, especially during COBES in the rural settings, has been limited in our sub-region.

This study also revealed that role modeling in the rural community during COBES may have an effect on career choices of medical students. The majority of the students indicated that role modeling during COBES could influence their choice of specialty and practice location, 51.5% and 60.4%, respectively. This has been similarly reported in other studies in the developed countries.[12] It is indeed known from the medical education literature that role models have a strong influence on the career choices of medical students.[9]

It further became evident that teaching staff play an important role in mentoring and modeling students in their professional career. The use of teaching staff as role models for professional behavior has long been an informal and unplanned part of medical training when students learn from direct observation of skilled doctors.[8,9,11,12] Since this study clearly revealed the pivotal role of faculty members in modeling students in their professional career, this role should perhaps be more explicitly acknowledged in the medical education curriculum.

Apart from the personal and teaching attributes mentioned above, the students also identified several additional qualities in persons they considered as positive role models in the community. A willingness to help the community, a positive attitude to work in the rural area, compassion for the sick exhibited by health workers, the commitment of some community members, opinion leaders, and chiefs to serve their communities no matter what, were some more additional qualities the students observed and these could serve as motivators to consider in their career choices. Students admired and learned a lot from these health workers who were mostly community health nurses and midwives. The students interacted with community members and health experts, who provided real opportunities for role modeling and socialization. The willingness to help the community, a positive attitude to work in the rural area and compassion for the sick exhibited by the health workers created emotional situations that tended to awaken

the civic responsibility of the students toward these rural communities. These constructive attributes assisted the students to form their own opinions and consequently change their unfounded fears of rural areas and, hopefully, they may influence the students in their future career choices. When medical students observe and are mentored by doctors working as primary health care physicians in the rural communities, this may have an influence on their choice of specialty and practice location through the role modeling they either passively or actively received.[17] Since these primary health care physicians work as generalists, who provided counseling and support in many diverse ways for the students, they would serve as excellent role models for medical students in the communities. Wright and Carrese[17] found that generalists were indeed more likely than subspecialists to be named as excellent role models.

Students also alluded to the fact that personal attributes such as displaying bad interpersonal relations, unapproachability, self-centeredness, arrogance, and laziness constituted negative role modeling attributes. These, the students observed could serve as a barrier to positive role modeling of medical students during COBES training in the rural communities.

Limitations

The survey was conducted in a single Ghanaian medical school, making it difficult to generalize our findings. But the results obtained are interesting, unique and could serve as a reference point for similar studies to be carried out in analogous Ghanaian institutions or in the sub-region or even in other low- and middle-income countries.

Conclusion

The desire and willingness to work in a rural community combined with good communication and excellent interpersonal and leadership skills are attributes of good role models for medical students during a COBES rotation that subsequently would influences medical students' career choices and readiness to work in a rural setting. Replication of the COBES program in other medical schools in the sub-Saharan region is, therefore, strongly advocated since it has many positive aspects as enumerated above. We also advocate that similar research work should be performed in other parts of the world, with similar conditions, to confirm the generalizability of the preliminary findings of this study.

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Appendix 4.1 Interview guide

UNIVERSITY FOR DEVELOPMENT STUDIES

SCHOOL OF MEDICINE AND HEALTH SCIENVES, TAMALE

My name is Anthony Amalba of the School of Medicine and Health Sciences of the University for Development Studies, Tamale. I am conducting a research on the Influence of PBL with COBES as an integral part of the undergraduate curriculum on specialty and rural workplace choices. This research is only for academic purposes for the award of PhD. I hereby crave your indulgence to support me in this research by filling the attached questionnaire.

Please, by accepting to complete this questionnaire, it suggests you have consented to participate in the research. Your participation in this study is voluntary and your responses will be accorded the needed confidentiality and anonymity.

Please you are kindly requested to answer all the questions and do so with all sincerity and honesty.

Thank you very much.

Interview Guide

1. Age:————————-
2. Sex: 1. Male2. Female
3. Who do you consider as a role model in the course of your professional training?
4. What qualities do you look for in a role model?
5. What characteristics do you think constitute an excellent role model?
6. What characteristics/attributes do you think constitute poor role model?
7. Who could serve as a role model during COBES in the rural community?

8. What characteristic/attributes do you look for in the one you consider as a role model in the rural community?
9. In your opinion, how could role models in the rural community during COBES have an influence on trainee's choice of specialty?
10. In your opinion, how could role models in the rural community during COBES have an influence on trainee's choice of place of work?

Chapter 5

The effect of Community Based Education and Service (COBES) on medical graduates' choice of specialty and willingness to work in rural communities in Ghana

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Abstract

Background
Career choices and placements of healthcare professionals in rural areas are a major problem worldwide, and their recruitment and retention to these areas have become a challenge to the health sector. The purpose of this study was to investigate the effect of Community Based Education and Service (COBES) on medical graduates' choice of specialty and willingness to work in a rural area.

Method
This cross sectional survey was conducted among 56 pioneering graduates that followed a Problem Based Learning/Community Based Education and Service (PBL/COBES) curriculum. Using a mixed methods approach, open-and closed-ended questionnaire was administered to 56 graduates. Cross tabulation using Chi-square test were used to compare findings of the quantitative data. All qualitative data analysis was performed using the principles of primary, secondary and tertiary coding.

Results
All 56 graduates answered and returned the questionnaire giving a 100% response rate. 57.1% (32) of them were male. Majority of them lived in towns (41.1%) and cities (50%) prior to medical school. A significant number of graduates (53.6%,) from the cities, without any female or male predominance said COBES had influenced their choice of specialty. Again, a significant proportion of graduates from the towns (60.9%,) and cities (67.8%,), indicated that COBES had influenced them to work in the rural area. However, there was no significant difference between males and females from the towns and cities regarding the influence of COBES to work in the rural area. Qualitative data supported the finding that COBES will influence graduates willingness to work in the rural area

Conclusion
The majority of graduates from the towns and cities in Ghana, with a male predominance, indicated that COBES may have influenced their choice of specialty and willingness to practice in the rural areas despite their town or city based upbringing.

Background

Recruitment and retention of healthcare professionals in the rural areas are major problems worldwide especially in developing countries. There is some evidence that Community-Based Education and Service (COBES) can be used to prepare and acclimatise healthcare professionals to work in rural areas and bring equity in the distribution of health professionals to benefit the rural communities.[1,2] Attention has now been focused on education and retention of medical doctors in Africa. The most commonly reported strategies to improve retention include increasing salaries for faculty, strengthening post-graduate education and launching or strengthening community-based education programmes.[3] Despite the challenges of COBES, such as unreliable public utilities, language barriers, the maintenance of high educational standards with the community doctors/health workers who supervise learners, the advantages of COBES include lower attrition rates, greater perceived ability to function in rural community and high satisfaction expressed by students and community members alike.[4] Structured community exposure and community-based education provide students with experiences of working with underserved populations and improve graduates' preparation to deal with national health problems.[5]

In Ghana, most of the communities are considered as rural. Only localities equal to or exceeding 5,000 persons have been classified in Ghana as urban since 1960. Despite the growth of urban population , Ghana continues to be a nation of rural communities, with the rural areas representing an estimated 66 percent of the population.[6] The physician to population ratio in the Greater Accra region is 1:5,000, whereas in the largely rural Northern region, with a population of over 2 million people, it is 1: 92,000.[7] This skewed distribution has consequences on the quality and availability of health care in remote regions of the country.[8]

Socio-economic conditions negatively impact on the willingness of healthcare professionals to work in rural areas in the developing countries. The inequity in distribution of health professionals, especially doctors, between the urban and rural areas according to studies conducted in Ghana have been attributed to better social amenities, infrastructure, income, an opportunity for career progression that the cities offer compared to the rural communities. Lack of recognition, rewards, mentoring, continuous education and the occurrence of professional imprisonment are commonly cited as reasons for the low rate of willingness to accept or seek rural postings.[8-11] Some authors therefore suggest to include a compulsory student rotation in rural areas to decrease or remove the often voiced fears perceived by medical students (often from urban areas) and better inform them about the actual practice conditions in remote rural areas.[9]

Students' rural background (those who are born and grow up in the rural areas) has been found to be associated with future rural career choice. This is evidenced by the results of a considerable number of studies originating in America,[12] Australia,[13-15] Canada,[16] Japan,[17] Norway,[18] South Africa[19] and Scotland.[20] Without exception, these studies have confirmed that medical students from a rural background are more likely to take up rural medical practice than their peers from city origins.

In contrast, a limited number of studies on factors which influence career choices of trainees in rural areas of low income countries are available. A recent review of attraction and retention policies highlighted the need to analyse first, local data about health worker decision making and the challenges of rural service in a given country in order to get information about the value of various incentives.[8] Most of the studies conducted in rural settings have been situated in developed countries.[21] However, we have to be mindful that the definition of 'rural' can vary and rural areas have distinct characteristics that include isolation, limited access to healthcare, small populations, significant distances between services and providers and informal social structures.[22] Though rural practice comes with its unexpected challenges regardless of the geographical location, rural settings in the developed world can be totally different from rural settings in the developing world. Notable differences are unmotorable road network, lack of electricity, and more prominent lack of social infrastructure (e.g. health facilities and schools). Studies performed in more developed countries are therefore difficult to compare to those performed in developing countries.

Up to date, the Ghana Ministry of Health (MoH) and donor agencies remain uncertain about which investments have the potential to measurably improve the number, retention and distribution of health personnel. Investments have been cautious and creating sufficient human resource for health has been described as a potential challenge until interventions have been rigorously evaluated for the desire impact in areas that could improve the number, retention and distribution of health personnel.[8,23,24]

While previous research has thus looked at working conditions of health workers and incentives to promote uptake of rural posts, disparities or gaps regarding health professionals especially doctors still exist between the rural and urban settings. Though few studies in Ghana have looked at the factors and likelihood or willingness of Ghanaian medical students to practice in the rural area, the effect on the use of rural communities as a training platform on graduates choice of specialty and practice location in Ghana has not been investigated.[8]

Nevertheless, most of the literature acknowledged the need to use rural communities in the training of medical students as well as the need to compulsorily define the period of this rural education and service.[8-11]

Since evidence for this approach is thus largely lacking, this study explores whether the exposure of medical graduates to the rural communities as part of their training has an effect on their choice of specialty and willingness to work in the rural area.

Methods

Setting

The University for Development studies (UDS), School of Medicine and Health Sciences (UDS-SMHS) which was established in 1996, is one of the five campuses of UDS and located in Tamale in the rural Northern Region of Ghana. UDS-SMHS adopted a (PBL/COBES) medical school curriculum in 2007 in response to reforms in medical education. The COBES component of the PBL/COBES curriculum is a platform that enables students to learn and also provide service to the community. After a first year of participating in the University-wide interfaculty community-based programme, the COBES programme for medical students starts in year 2 and continues up to year 7. For the first 3 years (year 2 to 4), students are sent to communities with at least a primary health care facility. Each of these three years, in the period from July to August, the students spend four weeks in the community in groups of 8-10 students per community. The COBES curriculum is iterative and each year builds upon the previous years' experience thereby updating, improving and expanding the activities of the previous year. Depending on the year of the programme students are expected to identify and explain factors (e.g. demographic, economic, social, cultural, political and environmental) that affect the community health, perform a study resulting in a community health diagnosis to identify community health needs and subsequently prioritise them and identify the resources available in the community to contribute to meeting those needs. At community level students thus design and implement a health intervention based on community health diagnosis. They also take turns to rotate through the various sections of the health facility, like, for example, dispensary, consulting rooms, Maternal and Child Health clinic and the laboratory as well as participate in the scheduled immunizations by the health facility in the communities. In years 5, 6 and 7 students are sent to district hospitals to introduce them to the secondary level of care, again for a period of 4-6 weeks.

Participants and questionnaire

Following a cross-sectional design, this study was conducted from June to July 2014. Participants were medical graduates of the UDS-SMHS. These graduates were the

pioneers (the first batch of students to follow the programme) of the PBL/COBES curriculum. They had finished their educational program at UDS-SMHS and were leaving the school to various accredited hospitals for their internship training.
Using trained research assistants, all recruitment and data collection processes were conducted during an orientation program that sought to prepare the graduates for their internship training at various hospitals in the country. Although, 78 students graduated, only 56 of them attended the orientation programme. Thus the rest of the 22 graduates did not participate in the study because they got the information for the orientation programme late and as a result did not tend up for the programme. Given the fact that the students' had graduated, the orientation programme was the only opportunity to administer the questionnaire to them. All data was collected using a 14-item questionnaire that consisted of opened- and closed-ended questions. The questionnaire assessed demographic factors, the medical graduates' perception of the usefulness of COBES and the perceived influence of COBES on their choice of specialty and willingness to accept rural postings. The setting of the residence of the medical graduates prior to admission to the medical school was also assessed (see Appendix 5.1). The items of the questionnaire were derived from the literature and assessed by experts in the field who considered them to be content valid. To ensure comprehensibility and understanding, the questionnaire was pretested on a sample of five students, the results of which led to slight modifications of the items. Ethical approval was granted by the Ethics Committee of the School of Medicine and Health Sciences, University for Development Studies.

Data analysis

Quantitative data were entered into Microsoft Excel and analysed using GraphPad Prism, Version 5.01 (GraphPad Software Inc., San Diego CA). Results were presented as frequencies and proportions of the total sample recruited. Association between variables such as gender, place of residence, choice of specialty and practice location were assessed using cross tabulation and Chi-square test. The setting of the residence of the medical graduates prior to admission was classified into three categories: villages, towns and cities. All residential settings having populations less than 2000 people, not classified as urban and lacking basic infrastructures like electricity, potable drinking water, public utilities were considered as villages. Place of residents classified as urban and having population less than 100,000 people was classified as a town. These had better public utilities than the villages. All place of residents that were urban and had settlements of 100,000 people and more and may span municipality or entity boundaries were classified as cities. All of these definitions were based on the UNDP's definitions of villages, towns and cities.[25]

Qualitative data analysis of responses to opened-ended questions was performed using Atlas ti version 6.0.15 GmbH-Berlin, applying the principles of primary, secondary and tertiary coding.[26] The responses to all the opened-ended questions were entered into Microsoft word with the help of a research assistant. The responses were read independently by AA and VM identifying common themes through the constant comparison method, identifying trends and using the common opinions expressed by the graduates. The identified themes were independently coded, enabling us to compare between graduates' responses. The independent codes generated by AA and VM were cross-checked by the second and fourth authors (AS and WvM). All discrepancies in the process were discussed until consensus was reached. Illustrative quotes were presented to underscore the findings where applicable.

Results

This section consecutively discusses the numerical results of the questionnaires and the results of the qualitative data analysis of answers to open-ended questions. Appropriates quotes from the graduates are cited.

The quantitative results of the student questionnaire

All 56 graduates answered and returned the questionnaire giving a 100% response rate. As shown in Table 5.1, the majority of the graduates were males (57.1%, n=32), lived in cities (50.0%, n=28) and perceived that COBES will influence their choice of specialty (44.6%, n=25). Although the differences were not significant, a higher proportion of females (50%, n=12) than males (40.6%, n=13) said COBES will influence their choice of specialty. Sixty-four percent of the graduates indicated that COBES will influence their willingness to work in a rural location and were significantly more likely to be male graduates (78.1%, n=25) than females (45.0%, n=11). Irrespective of gender differences, 82.1% (n=46) of the students said COBES will be useful for their future practice as doctors.

Graduates perceived that influence of COBES on their choice of specialty and willingness to work in a rural location was stratified by place of usual residence and presented in Table 5.2. Twenty percent of graduates from villages, 39.1% from Towns and 53.6 % from cities said COBES will influence their choice of specialty. The differences were not statistically significant. Although the differences were not significant a higher proportion of graduates who lived in cities (67.9%, n=19) compared to those who lived in villages (60.0%, n=3) and towns (60.9%, n=14) said COBES have influenced their willingness to work in a rural location.

Table 5.1 Demographic characteristics, place of residence and graduates perceived influence of COBES on choice of specialty, willingness to practice in a rural setting and perceived usefulness of COBES

	Total (n=56)	Male (n=32)	Female (n=24)	p-value
Place of Residence				
Village	5 (8.9%)	5 (15.6%)	0 (0.0%)	0.0638
Town	23 (41.1%)	12 (37.5%)	11 (45.8%)	0.590
City	28 (50.0%)	15 (46.9%)	13 (54.2%)	0.788
Choice of specialty				
Will affect	25 (44.6%)	13 (40.6%)	12 (50.0%)	0.589
Will not affect	23 (41.1%)	14 (43.8%)	9 (18.8%)	0.788
Unsure	7 (12.5%)	5 (15.6%)	3 (12.5%)	0.451
Choice of practice in a rural area				
Will affect	36 (64.3%)	25 (78.1%)	11 (45.0%)	0.023
Will not affect	12 (21.4%)	4 (12.5%)	8 (33.3%)	0.099
Unsure	8 (14.3%)	3 (9.4%)	5 (20.8%)	1.000
Perceived usefulness of COBES				
Useful	46 (82.1%)	28 (87.5%)	18 (75.0%)	0.298
Useful	46 (82.1%)	28 (87.5%)	18 (75.0%)	0.298

Table 5.2 Graduates perceived influence of COBES on choice of specialty and practice location stratified by place of residence

Variable	Village (n=5)	Towns (n=23)	Cities (n=28)	p-value
Choice of specialty				
Will affect	1 (20.0%)	9 (39.1%)	15 (53.6%)	0.299
Will not affect	2 (40.0%)	11 (47.8%)	10 (35.7%)	0.681
Unsure	2 (40.0%)	3 (13.0%)	3 (10.7%)	0.208
Choice of practice in a rural area				
Will affect (n=36)	3 (60.0%)	14 (60.9%)	19 (67.9%)	0.855
Will not affect (n=12)	1 (20.0%)	5 (21.7%)	6 (21.4%)	0.996
Unsure (n=8)	1 (20.0%)	4 (17.4%)	3 (10.7%)	0.739

The qualitative results of the medical graduates' questionnaire

The responses to all the open-ended questions were typed into Microsoft-word with the help of a research assistant. The responses were read through independently by AA and VM identifying common themes through the constant comparison method, identifying trends and using the common opinions expressed by the graduates. The identified themes were independently coded, enabling us to compare between graduates' responses. The independent codes generated by AA and VM were cross-checked by the second and fourth authors (AS and WvM). All discrepancies in the process were discussed until consensus was reached. Illustrative quotes were presented to underscore the findings where applicable.

Adaptation to rural lifestyle

COBES develops graduates to adapt to rural lifestyle making it easy to accept to work in the rural areas. 'I am more willing to work in a rural area, although I have always wanted to work in the north, I now have the motivation to do so' (City, female).

Equity to healthcare

During the period of their COBES program graduates realized the poverty levels in the communities and the need to help the less privileged to get access to quality and equity in health care. *'It (COBES) created awareness on the plight of rural northern Ghana. I will not refuse a posting to northern Ghana' (City, male)*.

Community health needs

The community health needs and the limited human resource in the community invoke the willingness and preference of graduates to want to work in the rural areas *'I am willing to work in the district and extend to the deprived areas of Ghana because that is where the real problems are' (Town, male)*.

Hospitality and culture of community members

Graduates learn the culture and lifestyle of the community when they interact with community members. As they live and work in the community without any friction, coupled with the hospitality of the community members, their willingness to go back to the community after graduation becomes strong. *'My experience in COBES has increased my desire to work in rural areas provided I am assured of continuous professional development (Town, male)'*

Discussion

This study revealed that the graduates from the towns and cities perceive that COBES could influence their choice of specialty with an overwhelming majority of them willing to work in the rural areas. Furthermore, COBES was shown to predominantly affect males regarding the willingness to work in rural areas. In contrast to the first finding, the latter finding that COBES has more effect on males than females regarding the willingness to work in rural areas was not unexpected. There is evidence that medical students from rural background are more likely to take up rural medical practice than their peers from the cities.[12] However, this study conversely shows that when students

from the towns and cities have part of their training in the rural community, it has some influence on their choice of specialty and preference to work in the rural communities.[9] When searching the literature to find support for this less well- known association, a similar study in Australia provided the needed support. The study was performed among graduates following a Parallel Rural Community Curriculum (a community based medical education program where students spend one academic year in the community) and revealed that this extended rural undergraduate experience has influenced them to undertake a rural career path, despite a city based upbringing.[27]

The present and prior findings are thus supportive of the notion that adaptable variables such as educational experiences can have a significant reinforcement effect as well as a positive influence on the practice intentions of medical students as they progress from matriculation to graduation. In addition to individual student characteristics including students' social background and geographical location of upbringing, participation in community health, cultural awareness/diversity and language-learning, educational experiences were associated with intention to practice in underserved areas.[28]

Although, rural origin has a strong motivating factor for students to return to rural practice in the developed world and has been factored into their selection and admission policies, this has not been included in the selection and admission policy of most developing countries including Ghana, either because of lack of enough evidence of this factor as a strong motivation to return doctors and other healthcare professionals to the rural areas after graduation or a very strict entry grade point to universities in developing countries. In the light of these findings, and the international literature, it would be appropriate that Ghana takes a critical look at the 'selection and admission policies in selecting students into the medical schools of the country.

A second important finding was that COBES continues to have more influence on males than female as it was clearly shown that 80% (n=12) (Table 5.1)of male graduates indicated that COBES will influence them to work in a rural and 87.5% (n=28) (Table 5.1) reporting COBES to be very useful to them. This has been reported in similar studies conducted in Australia and other countries, that men were more likely than women to enter rural practice.[12,29,30] However, there was similar agreement among males and females on the influence of COBES regarding their choice of specialty. This was similarly reported in a study on the role of intrinsic versus extrinsic motivations on medical students' willingness to work in rural areas in Ghana.[9] The study also found that the female gender was strongly associated with reduced interest in rural practice. This was also similarly reported among health staff that women are less likely to accept postings in remote areas.[31,32] Some of the explanations of reduced interest among women to practice in rural areas were for varying family reasons: they prefer to live in the same

geographical area in which their husbands worked, have difficulty of convincing their husbands to get transfers and following their wives to the rural areas, and desire better education, than can be found in the rural areas, for their children.

So far, strategies to recruit and retain rural health workers vary widely, including education reforms (conducting training programs in rural areas), financial incentives, and compulsory service. Evidence of the impact of these strategies especially of educational reforms on health worker distribution in low-and middle-income countries (LAMICs) is poor, due to structural obstacles within the health system, lack of legislation to back up reform policies, and resistance to change, which challenge the systematic implementation of policy change and evaluation of impact.[11]

The Ghana Ministry of Health (MoH) has implemented a number of incentives aiming at recruiting and retaining health staff in the country and deprived areas. These included a 20-30% salary top up for health staff in deprived areas (implemented in 2004) and a staff vehicle purchase scheme (implemented in 1997).[8] Neither has however yielded the desired results in addressing the lack of health professionals in remote areas.

Curriculum planners could also learn from this study and acknowledge that establishment of COBES as part of health training institutions curricula to provide rural exposure also serves the purpose of motivating students and creating a favourable attitude towards rural practice and positively influences graduates on their choice of specialty and willingness to work in the rural areas.

Limitations

The purposeful selection of participants may lead to selection bias which could affect the results of the study. Furthermore, the limited number of graduates from rural background in this study limits the drawing of valid conclusions for this subgroup. This also makes it impossible to compare the results of this study with well established evidence internationally that rural background is associated with willingness to practice in remote areas and choice of specialty after graduation. This is supported by findings of a considerable number of international studies.[12-15] This is also a cross-sectional study that makes it difficult to determine the direction of the association. The findings of this study should also be discussed in light of the fact that we did not collect any data on the socio-economic status of the parents/guardians of the graduates.

Further studies should thus be done with larger cohorts of graduates with rural background in Ghana. Likewise, the fact that there were no female graduates of rural background made it difficult to assess the willingness of female graduates of rural background to practice in remote areas and make a comparison with their male counterparts.

Conclusion

The majority of graduates from the towns and cities in Ghana, with a male predominance, indicated that COBES influenced their choice of specialty and willingness to practice in the rural areas despite their town or city based upbringing. Based on these findings, it is recommended that the Ghana MoH could consider initiating pilot interventions especially educational reforms focusing on COBES in addressing the disparity of health professionals in the remote areas of the country.

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Appendix 5.1

UNIVERSITY FOR DEVELOPMENT STUDIES

SCHOOL OF MEDICINE AND HEALTH SCIENCES

PBL OFFICE

EXIT QUESTIONNAIRE FOR PIONEERING GRADUATES OF PBL/COBES CURRICULUM

Introduction

The School of Medicine and Health Sciences (SMHS) of the University for Development Studies (UDS), Ghana, successfully adopted its traditional medical training curriculum to Problem-Based Learning (PBL) and Community-Based Education and Service (COBES) methodology in 2007. COBES describes those "learning activities that use the community extensively as a learning environment, in which not only students but also teachers, members of the community, and representatives of other sectors are actively engaged throughout the educational experience" (World Health Organization, WHO, 1987). COBES component of the PBL/COBES curriculum of UDS-SMHS is the process by which teaching and learning is done in the community. As pioneer Graduates (first batch of students) of the PBL/COBES programme we would be grateful if you could spend some time to complete the questionnaire on your experiences of COBES in the communities.

Demographic characteristics

1. What is your age: ……..

2. Gender 1. Male 2. Female

3. Where were you living before entering medical school? (Tick)
   1. Village
   2. Town
   3. City (NB. The cities in Ghana are Accra, Kumasi, Takoradi/Sekondi, Tema, Ho and Tamale)

4. Do you think COBES is useful in the study of medicine?
   1. Yes
   2. No

5. If yes to 4 above, what are your experiences with COBES regarding its usefulness in the study of medicine?

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6. Do you think your experience could affect your choice of specialty in the future?
   1. Yes
   2. No
   3. Other (state)

7. If yes to 6 above, how will your experiences in the community through COBES affect your choice of specialty?

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8. Do you think your experience through COBES could influence your choice of practice in a rural location?
   1. Yes
   2. No
   3. Other (State)

9. If yes to 8 above, how will your experience in the community through COBES affect your practice location in a rural location?

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10. Do you think the communities in which you undertook COBES benefited in any way from the programme?
    1. Yes
    2. No

11. If yes to 10 above, in what ways was COBES beneficial to the community?

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12. What are your impressions regarding the organization of COBES by the medical school?----------
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13. What could be done to improve students' experience of COBES?----------
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14. What would, in your opinion, encourage students to want to choose a rural placement?

I APPRECIATE YOUR TIME SPENT TO COMPLETE THIS QUESTIONNAIRE. THANKS

Chapter 6

Working among the rural communities in Ghana - Why doctors choose to engage in rural practice

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BMC Medical Education 2018;18(1), 133

Abstract

Background
An unequal distribution of health personnel, leading to unfavourable differences in health status between urban and rural populations, is a serious cause for concern globally. Part of the solution to this problem lies in attracting medical doctors to rural, remote communities, which presents a real challenge. The present study therefore explored the factors that influence medical doctors' decision to practise in rural Ghana.

Methods
We conducted a cross-sectional descriptive study based on questionnaires. Participants were doctors working in health facilities in the districts and rural areas of the Northern Region, Ghana. The qualitative data analysis consisted of an iterative process of open, axial and selective coding.

Results
We administered the questionnaires to 40 doctors, 27 of whom completed and returned the form, signalling a response rate of 67.5%. The majority of the doctors were male (88.9%) and had been trained at the University for Development Studies, School of Medicine and Health Sciences (UDS-SMHS) (63%). Although they had chosen to work in the remote areas, they identified a number of factors that could prevent future doctors from accepting rural postings, such as: a lack of social amenities, financial and material resources; limited career progression opportunities; and too little emphasis on rural practice in medical school curricula. Moreover, respondents flagged specific stakeholders who, in their opinion, had a major role to play in the attraction of doctors and in convincing them to work in remote areas.

Conclusions
The medical doctors we surveyed had gravitated to the rural areas themselves for the opportunity to acquire clinical skills and gain experience and professional independence. Nevertheless, they felt that in order to attract such cadre of health professionals to rural areas and retain them there, specific challenges needed addressing. For instance, they called for an enforceable, national policy on rural postings, demanding strong political commitment and leadership. Another recommendation flowing from the study findings is to extend the introduction of Community-Based Education and Service (COBES) or similar curriculum components to other medical schools in order to prepare students for rural practice, increasing the likelihood of them accepting rural postings.

Background

The unequal global distribution of health personnel is a serious problem confronting the health sector. This disparity of health personnel between the rural and urban populations can contribute to differences in health outcomes.[1] People living in rural communities are not well educated, poorer and have the worst access to healthcare, compared to those in urban areas.[2] In fact, in proposing his inverse care law, Hart already pointed out long before that those who have the greatest needs regarding healthcare normally have the worst access to healthcare services.[3] The absence of better living conditions or social amenities such as good schools with qualified teachers for children, good accessible roads and transportation system, electricity and potable water have been quoted internationally[4,5] as barriers to the retention of health workers, notably doctors, in remote areas.

Some middle- and low-income countries have implemented several strategies to motivate health workers to accept rural postings. Thailand and Sierra Leone, for instance, have adopted coercion and financial measures to make doctors accept postings in rural areas. Likewise, the Ghanaian government has resorted to a 20-30% salary top-up and a staff vehicle hire purchase scheme for health staff in an effort to attract and retain health workers in rural areas. However, neither of these has yielded the desired results in addressing the lack of health professionals in rural areas. A review of the literature on the attraction of health staff to rural areas in middle- and low-income countries and their retention clearly points to poor working conditions such as a lack of potable water, poor sanitation, limited career progression prospects, a lack of management and community support and the absence of proper equipment and infrastructure at the health facility level[1,6-8,10] as reasons deterring doctors from gravitating to rural areas. Other factors potentially influencing health workers' willingness to practise in remote communities, as studies in the field of primary care have revealed, are socioeconomic status, rural background, gender, culture, and individual and curriculum characteristics, although some variations may occur across settings.[8,11-13]

Recognising that the shortages and maldistribution of the health workforce pose a significant threat to the health system in Ghana,[14] the Ghanaian Ministry of Health has identified key areas that require attention in order for health workers to gravitate to the country's rural areas and remain there, specifically: income disparity, lack of career progression opportunities, accommodation and workload.[15,16] While previous research has addressed incentives for medical students to take up rural practice later in life, few studies have hitherto explored the factors that induce medical doctors in particular to

gravitate (or not) to the rural areas of Ghana and remain there.[15] This is precisely what the present study seeks to accomplish.

Methods

Setting

As one of the developing countries in sub-Saharan Africa, Ghana is located on the West African coast and has a population of approximately 28 million people. We conducted this study in one of the country's ten administrative regions, specifically the Northern Region, which has Tamale as its capital city and a population of over 2 million inhabitants. Most of the communities in the region are deprived. The region counts 345 health facilities and is divided into 26 districts, each having at least one district hospital, a number of health centres, Community-based Health Planning and Services (CHPS) compounds and maternity homes. The Ministry of Health has assigned specific levels of care to these facilities, depending on the category of health staff managing the facility: Level M refers to maternity homes (managed by midwives); Level A to CHPS compounds (managed by a nurse with public health background); Level B1 to health centres without a doctor; Level B2 to health centres with a doctor; Level C to District hospitals; and Level D to regional and tertiary hospitals (MOH, 2010).

The School of Medicine and Health Sciences of the University for Development Studies (UDS-SMHS) is the only medical school in the region that offers community training as an integral part of the curriculum, known as Community-Based Education and Service (COBES). Through COBES, students spend four weeks in the same community in each of the first three years of the programme. In the first year, they learn to identify and explain factors -demographic, social, environmental and economic- affecting the community's health. In the second year, they conduct a study into the health needs resulting in a community health diagnosis, whereas in the third year they undertake to resolve those needs by identifying resources available in the community. The aim of this curriculum element is to teach students to provide service to the people in the community. In later years of their medical training, students are sent to the district hospitals for a community rotation of 6 to 8 weeks.

Questionnaire and participants

We conducted a cross-sectional descriptive study among doctors working in health facilities in the Northern Region between September 2016 and March 2017. To collect

data, we used a 23-item questionnaire consisting of both open- and closed-ended questions about participants' demographic characteristics, medical school, motivation, challenges, perceptions and preferences related to work in a rural area. The questionnaire was developed by the first author, construct-validated by the second, third and fourth authors who reformulated some questions for clarity, and then pretested on three medical doctors in the West hospital, Tamale, who made minor changes. Participants were purposefully and conveniently selected among physicians in the district hospitals and level B2 health centres. Two research assistants visited all the district hospitals and level B2 health centres and distributed the questionnaires to all 40 doctors on the spot on the day of the visit. They explained the purpose of the study to participants and assured them of confidentiality of their responses. In follow-up visits, they collected the completed questionnaires. Participation was voluntary and all participants who agreed to participate in the study gave verbal informed consent. We obtained ethical approval from the Tamale Teaching Hospital Ethics Review Committee (TTHERC ID No. TTHERC/17/11/16/03). The Regional Director of Health Service, Northern Region, granted permission for the use of the district hospitals and health centres as study sites.

Data analysis

We performed a qualitative content analysis of the responses to the open-ended questions using Atlas TI, version 6.0.15 GmbH-Berlin, and applying the principles of primary, secondary and tertiary coding.[26] AA and WvM read the responses independently, identifying common themes, trends and shared opinions among participants using content analysis. The identified themes were independently coded, enabling us to compare doctors' responses. The independent codes generated by AA and WvM were cross-checked by the second and third author (FAA and AS). In the process, researchers discussed all discrepancies until they reached consensus.

Results

In the following, we will first present the quantitative results, followed by the qualitative results pertaining to the open-ended questions. Illustrative quotes are cited where necessary.

Quantitative results

Of the 40 doctors we invited, 27 completed the questionnaire, signalling a response rate of 67.5%. As shown in Table 6.1, the majority of the doctors working in the district and rural areas of northern Ghana were male (88.9%) and had been trained at the UDS-SMHS (63%).

Table 6.1 Participants' demographic characteristics, including the no. of years spent in rural practice and the type of medical education received.

Gender	N	%	
Male	23	88.9	
Female	4	11.1	
Age (in years) *			
25-29	7	25.9	
30-34	9	33.3	
35-39	4	14.8	
40-44	3	11.1	
45-49	0	0	
50-54	2	7.4	
University attended			
UGSMD	2	7.4	
KNUST-SMS	1	3.7	
UDS-SMHS	17	63	
Others			
Eastern Europe	5	18.5	
Turkey	2	7.4	
Experience in rural practice (in years)			
0-11 months	9	33.3	
1-5 years	11	40.7	
Above 5 years	7	26	
Curriculum type**			
UGSMD			Traditional
KNUST-SMS			Traditional
UDS-SMHS			PBL/COBES
Eastern Europe			
Turkey			

* Two missing values; ** UGSMD: University of Ghana School of Medicine and Dentistry; KNUST-SMS: Kwame Nkrumah University of Science and Technology-School of Medical Sciences; UDS-SMHS: University for Development Studies-School of Medicine and Health Sciences.

As can be construed from Table 6.2, 74% of participants felt their respective medical schools had adequately prepared them for rural practice and that these schools were generally well-equipped to prepare medical students for this job.

Table 6.2 Participants' perceptions of preparedness, awareness of the challenges involved and motivation to work in rural areas.

Item	Yes		No	
	n	%	n	%
Medical school prepared* me for rural practice	20	74.1	7	25.9
Medical school can prepare students for rural practice	20	74.1	7	25.9
Medical students are aware of the challenges related to living and working in rural areas **	20	76.9	6	23.1
Has your motivation to work in rural areas changed since you started working there?**	5	19.2	21	80.8

* Preparedness was measured by the number, if any, of community-based-education components in the curriculum; ** One missing value.

Qualitative results

In the following paragraphs, we will expand on each of the themes that emerged from the qualitative data analysis. For an overview of the main categories, subcategories and themes, please refer to Table 6.3. After that, we will highlight the key players who, in participants' view, can make a major contribution to the attraction and retention of doctors in Northern Ghana's rural areas (also see Figure 6.1). In order to guarantee confidentiality and participants' anonymity, we de-identified all quotes by assigning generic codes for both participants and institutions. While we numbered the health facilities (as in HF1 = Health Facility one), we also distinguished between male and female doctors (MD = male doctor; FD = female doctor). For example, a quote ending in HF2FD refers to a quote from a female doctor at health facility 2.

Table 6.3 Deterrents and motivators regarding practice in rural areas

Category	Sub categories	Themes
Motivators	Knowledge improvement	To acquire skills, knowledge and experience
		To become professionally independent
		Change of environment
	Altruistic considerations	Serving the needy is satisfying
		Awareness of inadequate human resources
Deterrents	Social challenges	Lack of social amenities
		Inadequate infrastructure of health facilities
	Financial challenges	Lack of financial and material resources
		Lack of tools and logistics
	Educational challenges	Little attention to rural practice in medical school curriculum
		Lack of skills training
		Teaching mostly theoretical
		Few career progression opportunities
		Lack of support from authority
		Lack of mentors
	Cultural challenges	Cultural barriers
		Family issues

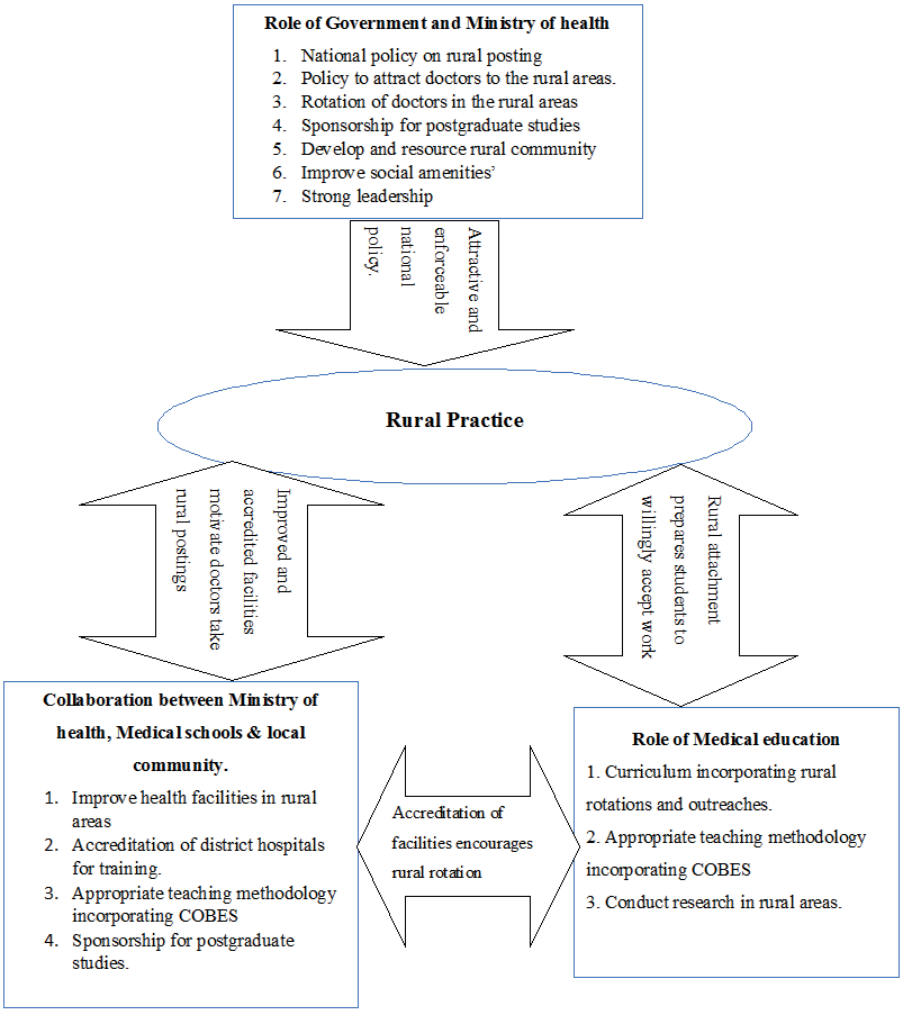

Figure 6.1 Strategies to encourage rural practice

Motivators

Improvement of knowledge and skills

The vast majority of respondents were drawn to rural practice by the desire to acquire more clinical skills and experience. They anticipated that by working in rural practice they would gain more confidence and, consequently, they would become more

professionally independent. In the words of one participant: *'Having exposure to more clinical cases in the district and learning more surgical skills perceived to be available in the district'. HF1MD.*

Altruistic considerations

Most of the doctors have had earlier encounters with the health facilities in the rural areas during medical training, where they witnessed a heavy workload with a low doctor-patient ratio. Awareness of these deprivations, such as a lack of doctors, instilled in them the desire to give something back to the communities where they were trained. As a result, they decided to return to these communities upon completion of medical training. The following quote clearly illustrates this: *'I visited the facility and saw the doctor-to-patient ratio was terrible with a variety of illnesses in the area. I realised the people needed help with more doctors hence I decided to stay'. HF10FD*

Deterrents

Social barriers

Although most of the doctors had gravitated to remote areas on their own free will, they did identify a number of barriers that could potentially deter future doctors from accepting rural postings (Table 6.3). Specific social barriers they mentioned were: a lack of good schools for their children, poor road networks and transportation, poor accommodation, poor Internet facilities and accessibility, and limited recreational activities. As one participant explained: '*Access to potable drinking water, electricity and other social amenities. Accommodation and other job opportunities are lacking in the rural area as compared to what pertains in the cities. Bad roads and poor transportation system'. HF14MD*

Access to resources

A second factor that could keep doctors from settling and staying in rural areas was the undersupply of adequate tools, and financial and material resources in most of the facilities. Especially, the lack of basic work instruments and equipment frustrated most of the doctors who worked in the rural areas. Increasing the supply of such basic necessities could be a powerful strategy to attract doctors to the rural communities, as one of the participants suggested: *'Facilities in rural areas should be equipped with basic logistics to make work easier'. HF13MD. And: 'Lack of some basic and essential equipment in the district hospitals leading to otherwise unnecessary referrals'. HF6MD*

Educational challenges

Some of the doctors pointed to the need for a greater emphasis on rural practice in medical training by offering rural rotations as an integral part of the curriculum. They experienced difficulties in finding a replacement when they wished to pursue their studies elsewhere in order to progress in their career. In their view, this was down to a lack of awareness among potential candidates of the benefits of rural practice. Consequently, doctors often felt neglected and abandoned by management or the authorities:

'Time should be devoted in the medical curriculum to create awareness to medical students as to the challenges involved in living and practising in rural areas and intensifying district rotations'. HF5MD

'It is difficult getting a doctor to take your place when the time is due for you to go for studies', HF4FD.

'Health workers in rural areas are always burdened and feel forgotten or neglected by the health authorities'. HF4MD.

Family and Cultural related factors

In a similar vein, cultural differences, language barriers, being unprepared for life in remote areas and being isolated from families could act as deterrents to practice in rural areas:

'Cultural practice, the challenges of rural lifestyle and the urge of living closer to my family make it difficult to accept to work in the rural area'. HF5FD.

Key players and their roles in addressing the undersupply of rural doctors

Participants flagged key players such as the Ghanaian Government, Ministries of Health and Education, medical schools and the community themselves, who had a major role to play in the attraction of medical officers to rural areas. Figure 6.1 provides an overview of these actors and their relevant roles. The next sections will elaborate on each of these actors and their roles which, for ease of understanding, have been translated into strategies to address the undersupply of doctors in rural and remote areas.

The Government and Ministries of Health and Education

Reinvigorate policies to attract doctors to rural areas

Participants argued that the power to attract more doctors to the rural areas was concentrated, in part, in the hands of the national authorities who could reinvigorate existing policies to attract and retain doctors in the rural areas in Ghana'

A good package and committed incentives such as rural service allowances which are at least 20 percent of their basic salary and reducing the duration for waiting to be promoted to the next rank to at least three years will help boost morale and encourage the doctors to want to serve in the rural areas. HF4MD.

Sponsoring of postgraduate training in rural areas

Another suggestion made by participants was to offer sponsorships to medical graduates wishing to pursue their postgraduate training in rural areas: *'Yes, the government can encourage doctors to serve rural Ghana by giving postgraduate sponsorships and other preferential treatment to doctors who work in rural Ghana'. HC3MD.*

Rotation of doctors in the rural areas.

Some of the doctors suggested that a policy on compulsory rural rotation would help address the disparity of doctors between the rural and urban areas. They believed that such a strategy would afford young doctors the opportunity to learn to appreciate the rural lifestyle, potentially eliminating negative stereotypical views and inducing them to stay:

If a policy can be put in place such that doctors are made to rotate through rural areas after house job for a fixed number of years, say two years, after which they can leave to any other facility of their choice if they wished, and be replaced by another medical officer. HF8FD

Medical schools

Integration of rural rotations/outreaches into the medical curriculum

Another group of actors perceived to wield the power to address the undersupply of rural doctors were medical schools. Participants felt strongly that immersion of students in rural areas should not only constitute an integral part of the curriculum but also, when present, be of significant duration. In their view, such incorporation of rural outreach/practice into the curricula would acquaint medical students with rural

practice prior to graduation, thereby increasing the likelihood of them accepting rural postings. As the following participants pointed out: *'There were no rural training courses in our curricula. Medical school should design or include as part of the training a rural outreach programme; this will help prepare students to take up postings to the rural communities'. HF2MD. And: 'By allowing medical students to visit and possibly spend more time in rural areas during their academy and clinical work helps them to prepare themselves willingly to work in rural areas'. FH4MD*

Introduction of community-based education into the curriculum

In much the same vein as the previous point, participants made a case for introducing community-based education into medical training. This would expose students to the living conditions and lifestyle of the rural communities and help them appreciate the plight of the rural people. As a result, they would be better able to cope with rural life when posted there after graduation.
'COBES, which was part of my medical training, exposed me to the rural areas where I understood the plight of the rural folk'. HF10MD. And: 'UDS-SMHS graduates are doing well in the regions and should be recommended to other universities'. HF6MD

Regular assessment of the needs of rural doctors

Respondents further suggested that conducting regular research activities which seek the opinion of doctors on what motivates them to serve or leave the rural community, could inform the recruitment of doctors to rural areas and their retention for policymakers' consideration: *'By organising regular surveys among doctors in the rural areas to identify their needs and presenting such results to the authorities concerned'. HF1MD*

Collaboration between the key players

The final suggestion put forward by participants was that key players would do well to collaborate on matters of rural practice. For instance, medical schools should work together in partnership with the community in order to render its COBES programme effective. Such collaboration could result in the community offering transportation and supervisory assistance to students. It would also create a favourable learning environment for students, which, in turn, could increase the likelihood of them returning to the rural areas in the future: *'If the medical schools can collaborate with the rural hospitals in terms of them accepting medical students during their community postings as well as treating them well during their stay in the communities (COBES)'. HF10MD*

Accreditation of district hospitals for training

Participants also suggested that schools, hospitals and national authorities should join forces in order to increase the number of accredited hospitals in the region. By sending specialists to some of the district hospitals, the Ministry of Health could help raise quality standards in these institutions, making them eligible for accreditation. As a result, students would have more opportunities to undertake an accredited specialty training after graduation. A positive experience could make young doctors want to stay and work there after their training has ended, thereby helping address the undersupply of doctors in such areas: *'We need more district hospitals to be accredited for training to enhance compulsory posting of interns to the district hospitals'. HF1MD*

Discussion

A number of factors influence medical doctors' decision to practise in rural remote communities. The medical doctors who took part in this study had accepted rural postings for the opportunity it afforded them to take an active role in patient care, gain experience and hone their clinical skills, and also to ultimately gain professional independence. Apart from these reasons, they were drawn by a desire to serve the needy in a completely new environment. These results echo and confirm previous international research findings suggesting that acquiring experience, clinical skills and professional independence are common reasons for doctors to choose rural practice.[6,7,18-20] Although the doctors in this study had gravitated to remote areas on their own free will, they were challenged, negatively, by the lack of adequate infrastructure and social amenities in the rural areas. This is a common problem in Ghana and middle- and low-income countries in sub-Saharan Africa. Lack of suitable accommodation, inadequate basic tools and equipment were very disheartening and frustrated these doctors in the rural communities. According to participants, part of the solution to these community problems lay in effective collaboration between the community, medical schools and district hospitals. For instance, if the medical schools would clearly communicate to the district hospitals the time at which the students would arrive for their COBES rotation, the hospitals, in collaboration with the community members, could make appropriate accommodation arrangements. Furthermore, the international literature is quite unanimous in suggesting that the absence of better living conditions in rural remote communities, particularly in low- and middle-income countries, adversely affects the retention of health workers, particularly doctors, in remote areas.[6-8]

Lack of career progression opportunities and professional isolation were key complaints voiced by the doctors in this study. Despite their willingness to work in rural areas, their enthusiasm had become overshadowed by a belief that entry into postgraduate studies would have been easier had they stayed in the cities. In their experience, the relevant authorities tended to forget about doctors stationed in the rural area when deciding on allocation of positions for postgraduate medical training. Hence, lack of career progression opportunities became a critical disincentive for these doctors to serve in rural areas. Study delays, lack of continuing professional development and a feeling of being 'abandoned' by the ministry were sources of concern to the doctors working in the rural areas. These have been long-standing problems in Ghana and successive governments have been struggling to address some of these challenges.[9,15] To improve the supply of doctors in rural communities, the government should address these challenges or barriers considering their effects on the attraction and subsequent retention of doctors in the rural areas. This calls for a long-term, attractive and enforceable national policy on rural posting with a strong political commitment and leadership and some collaborative efforts between Ministries of Education and Health and the communities.

An additional key finding in this study is the important and paramount role of medical education. Most of the doctors we surveyed were graduates of the UDS-SMHS which includes rural exposure as an integral part of the curriculum through its PBL/COBES component. To increase the attraction and retention of medical doctors in remote practice in sub-Saharan Africa and middle- and low-income countries, medical students should be exposed to the rural communities early in training. Respondents suggested that medical schools should thus incorporate rural outreach/practice in the curricula to make students spend time in the rural communities before they graduate, in order to prepare them for rural practice and increase the likelihood of them accepting rural postings. The respondents envisaged a clear role for medical education in attracting doctors to such areas and retaining them by means of early rural exposure. To accomplish this, medical schools must incorporate appropriate teaching methods in the curricula, such as COBES, rural rotations and outreaches. Similar suggestions on the role of medical education in the attraction of doctors to the rural communities and their retention have been made by prior studies on Community-Based Education and Service (COBES).[21] Another finding of this study was that providing students with community-based education may increase their likelihood of working in rural areas after graduation. Similar to previous reports more than 60% of the participants of this study were doctors from UDS-SMHS that runs a community-based programme for students. As shown in a study conducted in Kenya, clinical rotations in peripheral, non-tertiary

hospitals motivated students to accept postings in peripheral hospitals.[20] Another study conducted in Uganda also reported that the decision to work in remote and underserved communities was mostly influenced by exposure to rural-based training.[22] It has indeed been reported that students were more inclined to select rural practice upon graduation[23] when they had been previously exposed to rural rotations, a study from Australia reports. Furthermore, a South African study reported that curricular interventions appeared to influence the choice of practice location and that, after controlling for other factors such as rural background and targeted selection of rural students, doctors who worked in rural areas were significantly more likely than urban doctors to report that rural exposure had influenced their practice location.[24]

UDS-SMHS graduated doctors previously showed their willingness to work in the rural communities.[25] This is a manifestation of students' intentions, stated during their medical training and the choice of actual practice location after graduation. Strategies to enhance rural practice call for a review of the content and structure of medical curricula and the introduction of innovative pedagogy that incorporates community-based training as part and parcel of the overall education of medical students.

Another prominent finding in this study was the need to improve basic essential equipment, accredit various district health facilities and post specialists to these facilities for internship training and rural rotations. It is therefore very important for the Ghana Ministry of Health (MoH) to provide the necessary human and material resources for the health facilities to improve the delivery of healthcare in the rural communities. Again, the Ministry of Health, should consider creating incentives packages to attract and retain health professionals in the country and deprived communities in particular. This could be another powerful strategy to retain doctors in the rural areas after their internship. Most of the respondents further believed that the government has a duty to develop human resource policies and plans and should have the political will to implement and monitor them. Curriculum designers can learn from the findings of this and similar studies that instituting Community-Based Education and Service as part of health training institutions' curricula to provide rural exposure serves the purpose of motivating students and thereby creates a favourable attitude towards rural practice and positively influences graduates' willingness to work in the rural areas.

Limitations

This study has some limitations. The study was conducted in only one region of Ghana where UDS-SMHS is located and the limited number of responses to the survey, thus making it difficult to generalise the findings. However, the findings are interesting and concur with similar studies conducted in both developed and developing countries especially on the role of medical education in the training of doctors. The location of

UDS-SMHS in the region where the research was conducted could also have influenced the large proportion of UDS-SMHS trained doctors who participated in the study. The regions in which health professions institutions are located generally have more of the professionals practising in those regions. We would welcome replications of the present research in other regions of the country. Another limitation of this study is the use of open-ended questions that provided limited space for participants to write their comments. This did not allow participants to fully express their opinions and perspectives. However, the findings provide valuable information that is useful for future research and also adds to our understanding of the factors that motivate doctors to accept rural practice.

Another limitation is that doctors' work schedules did not allow for interviews to be conducted as they frequently indicated that their workload was high and they could not free time for the provision of verbal data. Although, the authors have the impression saturation was reached, it cannot be excluded that additional themes would have surfaced in a larger sample. This is a limitation of the study.

Conclusion

Ghanaian medical doctors are willing to work in the rural areas to acquire clinical skills, experience and professional independence. The key role of medical education in the attraction and retention of doctors to the rural communities was clearly acknowledged. Medical schools should incorporate rural outreach/practice, such as COBES, in the curricula to immerse students in rural practice, increasing the likelihood of them accepting rural postings after graduation.

In addition, the Ministries of Education and Health, in collaboration with the communities could improve the inadequacy of medical doctors in the rural communities by developing a national policy on rural posting. This Policy could be directed towards improvement of district health facilities as centres for internship training and rural rotation for medical doctors.

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Appendix 6.1

UNIVERSITY FOR DEVELOPMENT STUDIES
SCHOOL OF MEDICINE AND HEALTH SCIENVES, TAMALE

My name is Anthony Amalba of the School of Medicine and Health Sciences of the University for Development Studies, Tamale. I am conducting a research on the influence of PBL with COBES as an integral part of the undergraduate curriculum on specialty and rural workplace choices. This research is only for academic purposes, for the award of PhD. I hereby crave your indulgence to support me in this research by filling the attached questionnaire.

Please, by accepting to complete this questionnaire, it suggests you have consented to participate in the research. Your participation in this study is voluntary and your responses will be accorded the needed confidentiality and anonymity.

Please you are kindly requested to answer all the questions and do so with all sincerity and honesty.

Thank you very much.

Interview Guide for study 1

1. Age:----------
2. Sex:
    1. Male
    2. Female
3. Which Medical school did you graduate from? ----------
4. Which year did you graduate?----------

5. How long have you been working in the rural areas? ----------

6. What motivated you to work in the rural areas? ----------

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7. Has your motivation changed since you started work in the rural areas?
   1. Yes
   2. No

8. If yes, why----------

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9. If no, why not? What else is keeping you in the rural area besides reasons given above (Q 6. .c)?----------
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10. In your opinion why are doctors/health workers in general reluctant to work in rural Ghana (three most important reasons)?----------
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11. Do you think medical schools can prepare medical graduates for rural practice?
    1. Yes
    2. No

12. If, yes why?----------

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13. If, No why not?----------

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14. In your opinion, did your medical training adequately prepare you for a career in rural practice?
    1. Yes
    2.No

15. If yes in what ways did it prepare you for a career in rural practice? What were the aspects of the training you valued in this regard?----------
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    ---

16. If no, why do you think that your medical training did not prepare you for rural practice? What aspects of training would have been contributory from your perspective? ----------
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17. Are medical students aware of the challenges of living and working in rural areas?
    1. Yes
    2. No

18. If Yes, What are the challenges?

    ---

19. If no, then how, in your opinion, can this awareness be created in the medical curriculum?----------
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20. What are some of the challenges/barriers one may face when working in rural Ghana as a medical doctor? ----------
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21. How can these challenges/barriers regarding rural work place choice of doctors be addressed? ----------
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22. How, in your opinion, can the government encourage doctors to serve in rural Ghana?

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23. Any other comments:----------

Chapter 7

Trainees' preferences regarding the choice of place of work after completing medical training in traditional or Problem-Based Learning/Community-Based Education and Service curricula: a study in Ghanaian medical schools

Amalba A, Abantanga FA, Scherpbier AJJA, van Mook WNKA

Submitted

Abstract

Introduction
The content and delivery of medical curricula is becoming more student-centred in accordance with the changing role of medicine in contemporary society. Similarly, medical education has integrated community-oriented medical education strategies in undergraduate medical training to help address the challenges of healthcare in the rural communities. These changes are likely to impact the strategies of delivering the content of undergraduate medical curricula.

Purpose of the study
This study explored medical trainees' preferences regarding place of work and choice of specialty after completing training using either the traditional or mixed Problem-Based Learning/ Community-Based Education and Service (PBL/COBES) curriculum in Ghanaian medical schools.

Methods
This study was a cross-sectional descriptive design using a questionnaire consisting of 25 open- and close-ended questions. The questionnaire was administered to 1st, 3rd and 6th year students of two medical schools in Ghana, University of Ghana School of Medicine and Dentistry (UGSMD) and University for Development Studies, School of Medicine and Health Sciences (UDS, SMHS). UGSMD uses the traditional method of teaching and learning, whilst UDS-SMHS uses (PBL/COBES) curriculum in the training of their students. Associations between gender, type of curriculum, choice of specialty and practice location were assessed using the Chi-square test. Logistic regression analysis was performed to determine the association between medical school and curriculum type and students' preparation for rural practice while controlling all other factors. Qualitative data analysis of answers to opened-ended questions was performed applying the principles of content analysis.

Results
Of the students from PBL/COBES track, 64.2% were male, and from the traditional track 52%. The majority (74.1%) of students from PBL/COBES track indicated that their medical school curriculum adequately prepared them for rural practice as compared to those from the traditional track (35.1%). Students from the traditional track were 80% less likely to state that their medical school curriculum adequately prepared them for rural practice compared to students from PBL/COBES track (OR=0.19, CI= 0.13-0.28, p=0.001 Students following the PBL/COBES curriculum opined that the programme was very useful and could influence their choice of future practice location. Students following the traditional curriculum called for the introduction of innovative teaching methodology incorporating rural outreach programmes as part of the medical curriculum.

Conclusion
Students using the PBL/COBES curriculum indicated that their curriculum adequately prepared them for future rural practice. Students following the traditional curriculum called for the introduction of an innovative teaching methodology incorporating rural outreach programmes. This, they believed, will help them cultivate an interest for rural practice and also increase their willingness to choose rural practice after graduation from medical school.

Introduction

The content and delivery of medical curricula is becoming more student-centred in accordance with the changing role of medicine in contemporary society. Medical education changed from the pre-Flexner period of apprenticeship model of medical training, through to the Flexner era of biomedical approach to medical training, to which the approach of community-oriented medical education has recently been added.[1] This new approach aims to train a team of health graduates with considerable knowledge and skills to work effectively in both rural and urban areas as well as to provide comprehensive healthcare. The societal changes and modifications in medical education are likely to impact the content of conceptually different undergraduate medical curricula.

The characteristics of the curriculum to which the students are exposed is indeed a factor which influences the way in which students approach learning.[2] In a traditional, discipline-based curriculum, lectures constitute the main instructional format, during which students passively acquire knowledge. Students consequently adopt a surface learning style such as rote learning and memorization, and consequently do not deliberately reflect on their learning experience. Contemporary medical training is becoming more student-centred, which emphasises active learning, and the assessment of clinical competence rather than the ability to retain and recall facts.[3]

Problem-Based Learning (PBL) evolved out of the 'learning by discovery' approach and the 'case study method'[4] as a way of acquiring knowledge about subject matter.[5] PBL is an instructional method characterised by the use of patients' problems as a context for students to learn problem solving skills and acquire and apply their knowledge of basic and clinical sciences.[6] Barrows indicated that PBL is explicitly used to get students to think and has been shown to activate relevant prior knowledge and makes students aware of uncertainties and gaps in their knowledge base.[7] Equally it has been demonstrated that PBL enables students to learn group-work skills, social skills and attitude, and it improves their communication skills.[8]

Thus PBL, which focuses on how students work and learn together in a collaborative environment, fits well into the theory of social constructivism.[9] Social constructivists take the view that a person's knowledge is internalised as a result of their interacting with the social environment.[10] Collaborative learning assigns learners an active and constructive role in their own learning.[11] Consequently, collaborative learning fits in with constructivist views of learning.

Research findings on PBL consistently show that the closer the resemblance between the situations in which something is learned and the situation in which it is applied, the better the performance.[12] The social constructive theory also places an emphasis on the

importance of the environment i.e. the 'context' in learning and behaviour. The so-called Community-Based Education and Service (COBES) programme describes those "learning activities that use the community extensively as a learning environment, in which not only students but also teachers, members of the community, and representatives of other sectors are actively engaged throughout the educational experience".[13] COBES does not only expose students early in their training and throughout their education to the public health and primary health care needs of rural communities, but also provides them with unique opportunities to learn in an environment that 'typically resembles' what they will encounter in their later professional life. In this regard COBES can thus be considered as situated learning. According to Schmidt[12], there is a close relationship between COBES and PBL, in that they both provide an authentic and contextual environment for students' learning. COBES, just like PBL, provides an opportunity for collaborative learning among students on the one hand and the people in the community on the other hand.[14]

There is also some empirical evidence that COBES and PBL can be used to prepare and acclimatise healthcare professionals to work in rural areas and bring equity in the distribution of health workers to benefit rural communities.[15-19] However, in Ghana, not all medical schools use a PBL/COBES curriculum in the training of doctors. Research on medical students' preferences to work in the rural areas after being trained with either the traditional curriculum or PBL/COBES curriculum in Ghana is limited. Will students using PBL/COBES curriculum be more willing to work in the rural area after graduation as compared to students using the traditional curriculum? This study will consequently explore medical trainees' preferences regarding place of work and choice of specialty in two medical schools, one of which uses the traditional method of teaching and the other the PBL/COBES methodology.

Methods

Setting

Ghana is a developing country with a population of over 25 million people according to the 2010 national census. The four medical schools in Ghanagraduate over 300 doctors annually. The fifth public medical school (School of Medicine of the University of Health and Allied Sciences, SOM-UHAS, located in Ho in the Volta region) was only recently established. The University for Development Studies School of Medicine and Health Sciences (UDS-SMHS) and University of Cape Coast School of Medical Sciences (UCC-SMS), adopted a PBL/COBES curriculum, whilst the other two, University of Ghana School of Medicine and Dentistry (UGSMD) in Accra and Kwame Nkrumah University of

Science and Technology School of Medical Sciences (KNUST-SMS) in Kumasi, use the traditional method.[20] In Ghana, undergraduate medical training consists of three years basic sciences and three years clinical training.

The COBES component of the PBL/COBES curriculum enables students to learn and also provide service to the rural community. For the first 3 years students are sent to communities that have at least primary healthcare facilities. In the first year, students learn to identify and explore the demographic, social, environmental, and economic factors that affect the community's health. In the second year, they conduct a study into the health needs of the community and this results in them making a community health diagnosis, and in the third year, they undertake to resolve these needs by identifying resources available in the community.

The COBES programme is iterative and each year builds upon the previous years' experience thereby updating, improving and expanding the activities of the previous year.[19]

Participants and questionnaire

This study has a cross-sectional descriptive design using a paper questionnaire consisting of 25 items of both open- and close-ended questions, administered on-site to all students after their respective lecture sections.

Students from UGSMD and UDS-SMHS participated in the study.

A literature review-based questionnaire was developed to reveal the perception and willingness of students to work in a rural area and also their future choice of specialty. The items of the questionnaire were construct-validated by FA, AS and WvM, all medical education experts. The questionnaire was then administered on site by the first author to students of years 1, 3 and 6 of the two participating medical schools in Ghanaian order to unravel educational factors that influence their preferences of place of work and choice of specialty as they enter and as progress during medical school. Participation in the study was voluntary and confidentiality and anonymity was ensured. All participants gave verbal consent. We obtained ethical approval from the Tamale Teaching Hospital Ethics Review Committee (TTHERC ID No. TTHERC/17/11/16/03).

Data analysis

Results are presented as frequencies and proportions of the total sample recruited. Associations between gender, type of curriculum, choice of specialty and practice location are assessed using the Chi-square test. Logistic regression analysis was performed to determine the association between medical school and curriculum type

and students' preparation for rural practice while controlling all other factors. Statistical significance was assumed at $p<0.05$. Data analysis was performed using Statistical Package for the Social Sciences (SPSS), version 18 (SPSS Inc, IBM, Chicago, IL, USA). Qualitative data analysis of answers to opened-ended questions was performed using Atlas TI version 6.0.15 GmbH-Berlin, applying the principles of primary, secondary and tertiary coding.[21] AA and WvM read the responses independently, identifying common themes, trends and shared opinions among participants using content analysis. The independent codes generated by AA and WvM were cross-checked by the second and third authors (FAA and AS). In the process researchers discussed all discrepancies until they reached consensus.

Results

The numerical results of the questionnaire of the qualitative analysis of the open-ended questions are consecutively described.

Quantitative results

Unanswered questions were considered as missing values and not included in the analysis. At UDS-SMHS, 281 students (100%) returned the questionnaire, whilst at UGSMD, 244 out of 275 students (88.7%) returned the questionnaire. Of the students from UDS-SMHS 63.7% were male, and from UGSMD 52% (see Table 7.1). The majority of students from UGSMD who lived in the city prior to entering medical school indicated that having part of the medical training in the rural areas would be useful. This was statistically significant ($p>0.01$) (see Table 7.3). Students from UGSMD were, significantly less likely to indicate that their medical school curriculum prepared them for rural practice as compared to students from UDS-SMHS (OR=0.19, 95% CI= 0.13-0.28, p=0.001) (see Table 7.6).

Male students were one-and-a-half times more likely to indicate that they were willing to work in the rural area after graduation as compared to their female counterparts (OR=1.6, 95% CI=1.23-2.29, p=0.009). Students who had lived in the rural areas prior to entering medical school were almost four times more likely to work in a rural area after graduation than those from the city (OR=3.91, 95% CI=1.75-8.75, p=0.001) (see Table 7.7).

Table 6.1 Socio-demographic characteristics of respondents

Name of Institution	UDS-SMHS		UGSMD	
Variable	N	%	N	%
Age*	16	5.7	9	3.7
19-23	164	58.4	163	66.8
24-28	82	29.2	68	27.9
29-33	16	5.7	3	1.2
34-38	3	1.1	1	0.4
Gender*	2	0.7		
Male	179	63.7	127	52.0
Female	100	35.6	117	48.0
Year of study				
1st year	137	48.8	67	27.5
3rd year	104	37.0	94	38.5
6th year	40	14.2	83	34.0
Place of family residence*	5	1.8		
Rural	31	11.0	16	6.6
Urban	100	35.6	96	39.3
City	145	51.6	132	54.1
Father's highest educational level*	17	6.0	2	0.8
None	6	2.1	5	2.0
Primary	20	7.1	9	3.7
Secondary	65	23.1	34	13.9
Tertiary	173	61.6	194	79.5
Mother's highest educational level*	23	8.2	2	0.8
None	10	3.6	5	2.0
Primary	62	22.1	29	11.9
Secondary	70	24.9	50	20.5
Tertiary	116	41.3	158	64.8

* Missing values. Of the students from UDS-SMHS 63.7% were male, and from UGSMD - 52%. The number of students from UGSMD who had lived in the rural areas prior to entering medical school was 6.6% as compared to 11.0% from UDS-SMHS

Table 6.2 Comparative analysis between the two institutions

Institution		UDS-SMHS	UGSMD	p-value
		Response		
Variable				
Find it useful having part of my medical school training in the rural area	Yes	238(86.2%)	202(91.4%)	0.072
	No	38(13.8%)	19(8.6%)	
Exposure to the rural area as part of my medical training will affect my willingness to accept practicing as a doctor in such areas	Yes	180(65.7%)	160(66.4%)	0.926
	No	94(34.3%)	81(33.6%)	
Would be willing to work in rural area after graduating as a medical doctor	Yes	145(52.7%)	141(59.0%)	0.156
	No	130(47.3%)	98(41.0%)	
My medical school training curriculum which I have completed so far, in my perception, adequately prepared me for a career in rural practice				
	Yes	197(74.1%)	84(35.1%)	<0.001
	No	69(25.9%)	155(64.9%)	

The majority of students from UDS-SMHS indicated that their medical school curriculum adequately prepared them for rural practice as compared to those from UGSMD. This difference was statistically significant (p<0.001).

Table 6.3 Having part of my medical school training in the rural area is useful.

Institution	UDS-SMHS			UGSMD			UDS-SMHS+UGSMD		
Variable	Responses		p-value	Responses		P-value	Responses		p-value
Gender	Yes	No		Yes	No		Yes	No	
Male	152 (86.4%)	24 (13.6%)	0.933	106 (89.1%)	13 (10.9%)	0.183	258 (87.5%)	37 (12.5%)	0.364
Female	86 (86.0%)	14 (14.0%)		96 (94.1%)	6 (5.9%)		182 (90.1%)	20 (9.9%)	
Year of study									
1st year	118 (89.4%)	14(10.6%)	0.323	48 (85.7%)	8 (14.3%)	0.031	166 (88.3%)	22 (11.7%)	0.096
3rd year	86 (82.7%)	18 (17.3%)		73 (89.0%)	9 (11.0%)		159 (85.5%)	27 (14.4%)	
6th year	34 (85.0%)	6 (15.0%)		81 (97.6%)	2 (2.4%)		115 (93.5%)	8 (6.5%)	
Family Residence									
Rural	27 (90.0%)	3 (10.0%)	0.775	11 (68.8%)	5 (31.3%)	0.002	38 (82.6%)	8 (17.4%)	0.311
Urban	84 (84.8%)	15 (15.2%)		79 (90.8%)	8 (9.2%)		163 (87.6%)	23 (12.4%)	
City	124 (86.1%)	20 (13.9%)		112 (94.9%)	6 (5.1%)		236 (90.1%)	26 (9.9%)	
Level of education of father									
None	5 (83.3%)	1 (16.7%)	0.477	2 (66.7%)	1 (33.3%)	0.321	7 (77.8%)	2 (22.2%)	0.315
Primary	18 (94.7%)	1 (5.3%)		9 (100.0%)	0 (0.0%)		27 (96.4%)	1 (3.6%)	
Secondary	52 (81.3%)	12 (18.8%)		31 (93.9%)	2 (6.1%)		83 (85.6%	14 (14.4%)	
Tertiary	150 (86.7%)	23 (13.3%)		158 (90.8%)	16 (9.2%)		308 (88.8%)	39 (11.2%)	
Level of education of mother									
None	9 (90.0%)	1 (10.0%)	0.491	3 (75.0%)	1 (25.0%)	0.232	12 (85.7%)	2 (14.3%)	0.359
Primary	56 (91.8%)	5 (8.2%)		28 (96.6%)	1 (3.4%)		84 (93.3%)	6 (6.7%)	
Secondary	60 (85.7%)	10 (14.3%)		45 (95.7%)	2 (4.3%)		105 (89.7%)	12 (10.3%)	
Tertiary	97 (83.6%)	19 (16.4%)		124 (89.2%)	15 (10.8%)		221 (86.7%)	34 (13.3%)	

The majority of students from UGSMD who lived in the city prior to entering medical school indicated that having part of the medical training in the rural areas would be useful. This was statistically significant (p>0.01).

Table 6.4 Would be willing to work in the rural area after graduation

Institution	UDS-SMHS			UGSMD			UDS-SMHS+UGSMD		
Variable	Yes	No	p-value	Yes	No	p-value	Yes	No	p-value
Gender									
Male	103 (58.5%)	73 (41.5%)	0.01	79 (63.2%)	46 (36.8%)	0.166	182 (60.5%)	119 (39.5%)	0.009
Female	42 (42.4%)	57 (57.6%)		62 (54.4%)	52 (45.6%)		104 (48.8%)	109 (51.2%)	
Year of study									
1st year	73 (55.7%)	58 (44.3%)	0.341	38 (57.6%)	28 (42.4%)	0.854	111 (56.3%)	130 (47.3%)	0.356
3rd year	49 (47.1%)	55 (52.9%)		52 (57.8%)	38 (42.2%)		101 (52.1%)	93 (47.9%)	
6th year	23 (57.5%)	17 (42.5%)		51 (61.4%)	32 (38.6%)		74 (60.2%)	49 (39.2%)	
Family Residence									
Rural	22 (73.3%)	8 (26.7%)	0.049	12 (80.0%)	3 (20.0%)	0.232	34 (75.6%)	11 (24.4%)	0.017
Urban	48 (49.5%)	49 (50.5%)		54 (57. 4%)	40 (42.6%)		102 (53.4%)	89 (46.6%)	
City	72 (49.7%)	73 (50.3%)		75 (57.7%)	55 (42.3%)		147 (53.5%)	128 (46.5%)	
Level of education of father									
None	5 (83.3%)	1 (16.7%)	0.442	4 (80.0%)	1 (20.0%)	0.053	9 (81.8%)	2 (18.2%)	0.201
Primary	10 (52.6%)	9(47.4%)		8 (88.9%)	1 911.1%)		18 (64.3%)	10 (35.7%)	
Secondary	31 (48.4%)	33 (51.6%)		24 (70.6%)	10 (29.4%)		55 (56.1%)	43 (43.9%)	
Tertiary	89 (52.0%)	82 (48.0%)		103 (54.5%)	86 (45.5%)		192 (53.3%)	168 (46.7%)	
Level of education of mother									
None	8 (80.0%)	2 (20.0%)	0.083	4 (80.0%)	1 (20.0%)	0.507	12 (80.0%)	3 (20.0%)	0.061
Primary	37 (61.7%)	23 (38.3%)		19 (67.9%)	9 (32.1%)		56 (63.6%)	32 (36.4%)	
Secondary	33 (48.5%)	35 (51.5%)		29 (59.2%)	20 (40.8%)		62 (53.0%)	55 (47.0%)	
Tertiary	55 (47.4%)	61 (52.6%)		87 (56.1%)	68 (43.9%)		142 (52.4%)	129 (47.6%)	

In general, a significant majority of male students were willing to work in the rural areas after graduation compared to their female counterparts ($p<0.01$). Students who had lived in the rural areas prior to entering into medical school were significantly more willing to work in the rural areas after graduation compared to those from the city ($p< 0.02$).

Table 6.5 My medical school training curriculum, which I completed so far, in my perception adequately prepared me for a career in rural practice

Institution	UDS-SMHS			UGSMD			UDS-SMHS+UGSMD		
Variable	Responses		p-value	Responses		p-value	Responses		p-value
Gender	Yes	No		Yes	No		Yes	No	
Male	125 (74.0%)	44 (26.0%)	0.963	40 (32.0%)	85 (68.0%)	0.286	165 (56.1%)	129 (43.9%)	0.798
Female	72 (74.2%)	25 (25.8%)		44 (38.6%)	70 (61.4%)		116 (55.0%)	95 (45.0%)	
Year of study									
1st year	83 (67.5%)	40 (32.5%)	0.051	9 (14.1%)	55 (85.9%)	0.0001	92 (49.2%)	95 (50.8%)	0.006
3rd year	80 (77.7%)	23 (22.3%)		26 (28.3%)	66 (71.7%)		106 (54.4%)	89 (45.6%)	
6th year	34 (85.0%)	6 (15.0%)		49 (59.0%)	34 (41.0%)		83 (67.5%)	40 (32.5%)	
Family Residence									
Rural	21 (77.8%)	6 (22.2%)	0.132	6 (37.5%)	10 (62.5%)	0.863	27 (62.8%)	16 (37.2%)	0.336
Urban	64 (66.7%)	32 (33.3%)		35 (36.8%)	60 (63.2%)		99 (51.8%)	92 (48.2%)	
City	110 (78.0%)	31 (22.0%)		43 (33.6%)	85 (66.4%)		153 (56.9%)	116 (43.1%)	
Level of education of father									
None	6 (100.0%)	0 (0.0%)	0.16	1 (20.0%)	4 (80.0%)	0.207	7 (63.6%)	4 (36.4%)	0.036
Primary	11 (57.9%)	8 (42.1%)		4 (44.4%)	5 (55.6%)		15 (53.6%)	13 (46.4%)	
Secondary	49 (77.8%)	14 (22.2%)		17 (50.0%)	17 (50.0%)		66 (68.0%)	31 (32.0%)	
Tertiary	121 (73.3%)	44 (26.7%)		62 (32.8%)	127 (67.2%)		183 (51.7%)	171(48.3%)	
Level of education of mother									
None	10 (100.0%)	0 (0.0%)	0.283	2 (40.0%)	3 (60.0%)	0.605	12 (80.0%)	3 (20.0%)	0.056
Primary	41 (71.9%)	16 (28.1%)		13 (44.8%)	16 (55.2%)		54 (62.8%)	32 (37.2%)	
Secondary	48 (71.6%)	18 (28.4%)		15 (30.0%)	35 (70.0%)		63 (53.8%)	54 (46,2%)	
Tertiary	83 (73.5%)	30 (26.5%)		53 (34.6%)	100 (65.4%)		135 (51.1%)	130 (48.9%)	

The majority of students from UDS-SMHS indicated that their medical school training curriculum prepared them for rural practice; however, a significant ($p<0.001$) number of students from UGSMD indicated that their medical school curriculum did not prepare them for rural practice.

Table 6.6 Association between medical school and curriculum type and students' preparation for rural practice.

		OR	CI (95%)	P-value
Find it useful having part of my medical school training in the rural area	UDS-SMHS	1		
	UGSMD	1.697	0.95-3.04	0.075
My medical school curriculum prepared me for rural practice	UDS-SMHS	1		
	UGSMD	0.19	0.13-0.28	***<0.001***

OR: Odds Ratio, CI: Confidence Interval. Students from UGSMD were, significantly less likely to indicate that their medical school curriculum prepared them for rural practice as compared to students from UDS-SMHS (OR=0.19, 95% CI= 0.13-0.28, p=0.001).

Table 6.7 Association of demographic characteristics with willingness to work in the rural areas after graduation.

Variable		OR	CI (95%)	P-value
Would be willing to work in the rural area after graduation	Female	1		
	Male	1.603	1.13-2.29	***0.009***
Would be willing to work in the rural area after graduation	City	1		
	Urban	1.21	0.85-1.81	0.26
	Rural	3.91	1.75-8.75	***0.001***

OR: Odds Ratio, CI: Confidence Interval. Male students were one-and-a-half times more likely to indicate that they were willing to work in the rural area after graduation as compared to their female counterparts (OR=1.6, 95% CI=1.23-2.29, p=0.009). Students who had lived in the rural areas prior to entering medical school were almost four times more likely to work in a rural area after graduation than those from the city (OR=3.91, 95% CI=1.75-8.75, p=0.001).

Qualitative results

The main themes that emerged from the qualitative analysis are presented below. Appropriate illustrative quotes are cited in *italics*.

The usefulness of rural medical training in the curriculum

Students from both institutions indicated the usefulness of having part of their training in the rural area. They believed it prepared them for future practice, gave them the opportunity to understand the determinants of health in the rural areas and broadened their knowledge base and clinical skills. They also perceived that it helped them develop empathy towards people living in rural areas.

> *'It exposes us to the rural settings so as to have a fair idea of what is going on there with regards to the health of the people. This will help us if we are posted there to work'. Male, UDS-SMHS.*

> *'It has the tendency of engaging me to see more critical medical situations/conditions in the presence of less available facilities which, in a long run, will build my experience'. Male, UGSMD.*

Students from both UDS-SMHS and UGSMD indicated that lack of adequate resources, facilities for training and tools to work with, in the rural areas, makes the rural outreach programme not very useful to them. UDS-SMHS students indicated that they were demotivated by the inability to use data gathered during COBES rotation for the benefit of the rural community.

Willingness to work in the rural area after graduation

The opportunity to improve on their knowledge base and clinical skills gave them the confidence to offer quality healthcare services, thus making them professionally independent in their future practice as doctors. The lack of human resources in the rural areas compared to the urban makes them want to fill the void of non-availability of doctors in such areas.

> *'Access to doctors in these rural areas is very poor. I would like to help bridge that gap. Also, I believe I would be more fulfilled bringing smiles to their faces'. Male, UDS-SMHS.*

> *'Physically, being a health professional is all about reaching out and helping people and how better to do this than providing my services at places where they are much sought after but for which they do not have'. Male, UGSMD.*

Unwillingness to work in the rural area after graduation

Lack of social amenities such as accommodation, good road and transportation network, good educational facilities, and well-equipped health facilities, will deter students from accepting to work in the rural areas after graduation in the future. Students from UGSMD specifically mentioned that the lack of rural experience during their medical school days will deter them from striving to go and work in the rural community. Issues such as language barrier and unwillingness to stay far away from their families were mentioned as factors that would likewise prevent them from accepting rural postings.

> *'Because I have never lived there, adapting to that kind of life will be challenging; besides getting equally good schools, as prevails in the urban areas, for my children will also be a problem'. Female, UGSMD.*

Exposure to the rural area as part of my training will affect my choice of specialty

Participants indicated that lack of access to quality healthcare as a result of inadequate human resources and the myriad of community health problems will make them specialise in areas that will help address the needs of the rural communities.

> *'This is because my encounter with patients in these areas will make me know the common diseases that affect them. This will increase my desire to specialise in an area that I can be of much help to the rural folks'. Male, UDS-SMHS.*

Suggestions that will help to improve the curriculum in the direction of rural training

Students from UDS-SMHS focused more on strategies that could improve the already existing COBES programme. These strategies included proper student orientation towards COBES, scheduling and executing regular monitoring and supervisory visits, selection of well-resourced and well-equipped health centres in the rural areas, orientation of health facilities staff on the objectives of COBES and making COBES compulsory in all medical schools in the country.

However, students from UGSMD centred their suggestions on the introduction of community-based education activities such as rural outreach programmes into their curriculum. They advocated for a curriculum that addresses the needs of the rural community, and promoted the idea of universities establishing medical schools in the rural areas. They also wanted the policy of recruiting specialists for rural communities to be looked at critically.

> *'We need more experiential training. Training should influence students attitude towards rural postings, engage students more in the community. Make COBES compulsory in all medical schools. The objectives of COBES to be discussed with the community. Ensure adequate monitoring and supervision'. Male, UDS-SMHS.*

> *'Take us on excursions to such places. Expose us to such training i.e. rural medical practice. Teach us the way of life and our culture to make us aware of the different people in our societies'. Female, UGSMD.*

Suggestions to refocus medical education towards rural practice in Ghana

Students of UGSMD suggested that to promote rural practice, medical education in Ghana should refocus on an innovative teaching methodology that incorporates rural

outreach programmes as part of the curriculum in general. Specifically, they advocated a policy of admissions of students from the rural areas to medical schools and improvement of infrastructure of health facilities in the rural communities. Meanwhile, UDS-SMHS students indicated that the PBL curriculum should focus on giving students more clinical skills training before the students go for COBES placement. They advocated that clinical staff should develop more interest in COBES and also participate fully in its activities.

> '*Prepare us clinically before we go to the communities. PBL should focus on clinical skills. Skills should be tailored towards addressing rural challenges. Clinical staff should participate in COBES activities. Medical doctors should be posted to the facilities during the period the students stay in the communities'. Female*, *UDS-SMHS.*
>
> *'The medical training should be more geared towards resolving the ailments in our own localities, make us interact more with the rural folks and case studies should focus more on the rural areas'. Male, UGSMD.*

Discussion

This study assessed the trainees' preferences regarding the place of work after being trained as doctors in either a traditional or a PBL/COBES curriculum. The study is unique in that it compared results from two established medical schools in Ghana. This study revealed that the type of curriculum used by medical schools may have an effect on the preparedness of students to choose rural placement after graduation. The majority of the students from UDS-SMHS indicated that their PBL/COBES curriculum adequately prepared them for rural practice. The UGSMD students indicated that lack of rural experience during their medical school training deterred them from wanting to work in the rural communities after graduation. The usefulness of COBES as an integral part of the medical curriculum has been reported in studies from Ghana, South Africa, Australia and the USA.[17,22-24] Some studies have indeed shown that medical schools that have a rural-oriented curriculum and offer a repeated rural experience to their students are more successful at graduating physicians who choose rural practice as a career.[25] A study on the influence of community-based education on undergraduate health professions students' decision to work in underserved areas in Uganda showed that the proportion of students who expressed the desire to practice in rural communities increased after the students had undergone COBES placement.[26] There is thus some

evidence that COBES can be used to prepare and acclimatise healthcare professionals to work in rural areas and bring equity in the distribution of health professionals to benefit the rural community.[15,16]

The citing of lack of accommodation and other social amenities by students in this study as reasons for not wanting to accept to work in rural areas is not new. The international literature is quite unambiguous about this fact and states that the absence of adequate living conditions in the rural areas, particularly in the low-and middle-income countries, are reasons adversely affecting the retention of health workers in these areas.[27,28] However, there is evidence that when students are exposed to COBES, the rural exposure has the potential to increase the number of graduating students likely to want to work in the such areas by a change in their attitude towards the *relative* importance of social amenities as an influencing factor for their decision to choose rural placement.[17]

Students from UDS-SMHS, having experienced the benefits of COBES, nevertheless advocated that students should be properly oriented before they are sent to the communities. They were of the view that regular monitoring and supervisory visits by faculty, selection of moderately well-equipped health facilities and orientation of the staff of health facility to be visited on the objectives of the COBES programme will go a long way to enhance the students' experience as well as the desire and willingness to accept future rural postings. UDS-SMHS students suggested that COBES should be made compulsory in all the medical schools in Ghana and that reforms incorporating rural outreach programmes as part of the undergraduate curriculum is the way forward in bringing equity in the distribution of health professionals to the rural areas.

Another key finding in this study is the relationship of students' rural background and their future career choice. This study revealed that students who had lived in a rural area prior to entering medical school were four times more likely to accept to work in the rural area after graduation than those from the city. This is consistent with all other studies in the international literature.[29-31] In the perspective, it would be prudent for Ghana to consider students with rural background during the selection and admission process into the medical schools.

In Ghanaian strict policy for admission into universities mainly considers the best aggregate score on six subjects (three core and three elective). The problem is compounded by the huge numbers of applicants vying for the few places to study medicine, making entry into medical school very competitive. Most students who gain admission to medical schools are typically from the cities where the pre-university schools have the best educational facilities, and better and well-trained teachers compared to those from the rural areas. It is thus not surprising that the majority of the students in this study are from the cities. Most of these students have not lived in the

rural area before and taking a rural career after graduation is very unlikely. However, when such students are exposed to the rural communities to undertake some of their educational activities there, they are thus more likely to develop a positive attitude towards the rural community.[17] Therefore, a rural practice experience introduced early during medical school training can positively influence students' attitude towards rural practice.

Another key finding was that COBES had more influence on males than females. Male students were one-and-half times more likely to indicate that they were willing to work in the rural area after graduation as compared to their female counterparts This has been reported in similar studies conducted in other countries.[17,29,32] Some potential explanations may that they have stronger ties with, as well as more responsibilities towards their families and therefore are unable to travel far away, they are unwilling to work alone in rural areas except if accompanied by their husbands; their inability to keep two separate homes, and the unavailability of good schools in the rural areas for their children.

As shown in this study, participants cited inadequate human resources and awareness of community health needs experienced during COBES as reasons that influenced them to make decisions to specialise in different fields of medicine relevant to rural practice. Both the lack of human resources and the health needs of the community have been consistently cited in literature as some of the factors that influenced students not only to make decisions as to which areas of medicine to specialise in but also invoked their willingness to work in the rural areas.[18,19]

Limitations

This study aimed to involve four Ghanaian medical schools; however, permission could only be obtained from two. Nevertheless, the findings provide useful insight into the opinions of students towards rural placements from the perspective of traditional and PBL/COBES curricula. In addition, we were unable to determine the net influence of the choice of teaching and learning methodology (i.e. PBL and traditional) on students' acceptance to work in the rural areas. Furthermore, the study was carried out by a staff of UDS-SMHS, with a positive attitude towards COBES.

Conclusion

Students using the PBL/COBES curriculum opined that the programme was very useful and could influence their choice of future practice location. They underscored the fact that their PBL/COBES curriculum adequately prepared them for future rural practice.

Nevertheless, they called for improvement in the COBES programme to even more positively influence students attitude towards rural practice. Students using the traditional curriculum called for the introduction of innovative teaching methodology that will incorporate rural outreach programmes as part of the medical curriculum. This, they believed, will help them cultivate an interest for rural practice and also increase their willingness to choose rural practice after graduation from medical school.

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Chapter 8

General discussion

Introduction

The overall aim of this thesis was to investigate the influence of Problem-based learning (PBL) with Community-based education and service (COBES) as part of an undergraduate medical curriculum on specialty and rural workplace choices.
There is an ongoing debate that, for medical education to be relevant, medical curricula should address the needs of the population served. Therefore, medical education can be considered excellent if it is responsive and relevant to local community needs.[1] The studies outlined in this thesis aim to contribute to this debate.
In this **Chapter** the results of the studies in the previous **Chapters** are discussed in perspective of the available scientific literature and how they contribute in answering the research questions formulated in **Chapter 1**.
After a discussion of the main results of the different chapters conclusions are drawn, the strengths of the studies highlighted, and their limitations identified. This **Chapter** ends with suggestions for further research and implications for practice.

Chapter 1

The introductory chapter of this thesis outlined a historical background of medical education. It looked at the many educational innovations implemented with the hope of achieving a meaningful learning environment and also addressing the needs of the community. Examples of such educational innovations were the introduction of the Problem-Based Learning (PBL) methodology and the Community-Based Education and Service (COBES).
The chapter outlined the theory underpinning PBL and COBES from the field of socio-constructive and social learning theories and subsequently described the characteristics of PBL in promoting students' active learning and COBES as involving students use of the community as an authentic learning environment.
Furthermore, it looked at the strong evidence, based on research findings, that supports the influence of role models on learners and the importance of positive role models during COBES rotations in enhancing learning and shaping the career paths of medical students and graduates.[2]
The chapter also described the socio-economic factors that have a negative impact on health professionals and the possible influence of these factors on their taking up rural practice after graduation. Additionally, the effect of curriculum types on trainee choice of practice location was explored in this chapter.

Finally, the purpose and justification of the studies and the outline of the research thesis were presented.

Chapter 2

In Chapter 2 we performed a systematic literature review of studies published in peer-reviewed journals that address COBES or other rural outreach programmes. It was shown that a number of health institutions in Africa have incorporated these programmes in their medical curricula as a means of addressing community health needs in order to fill the gaps in health service delivery at the rural levels and also to address the disparity of rural-urban workforce. However, it is important to note that through the systematic review, we noticed that most of the studies conducted on COBES or rural outreach programmes were limited to a few countries in Africa. The publications predominantly came from South Africa, Uganda, Ghana, Nigeria, Tanzania, Democratic Republic of Congo and Botswana. There was a total of 18 published peer-reviewed articles on COBES and rural outreach programmes from these countries mentioned above, published in English language.

We identified that there is cumulative evidence from studies from the above countries indicating that an educational intervention curriculum involving PBL/COBES, which incorporates rural outreach programmes has shown that exposing students to the rural areas as part of their training positively affects their eventual practice location.[3-8] It is therefore logical to say that training medical students with the traditional curriculum without any rural outreach programme with the expectation that they will opt to work in the rural communities is unrealistic and is unlikely to happen. The way forward for policy makers and health professional training institutions would be to embrace COBES and rural outreach programmes as part of their training curricula.

Furthermore, findings from the systematic review have revealed that COBES has had not only a perceived influence on students' willingness to work in the rural communities after graduating, but graduates have indicated that the undergraduate COBES experience had actually influenced their present practice location.[6,8-11]

Chapter 3

The studies on the main research question 2 focussed on a) the benefits COBES bring to the community, students and staff of the health facilities b) the challenges of COBES to stakeholders and c) the contribution of other stakeholders together with the

community to improve and sustain COBES for the mutual benefits of both. These are addressed in **Chapters 3** and **6** of this thesis.

The findings in **Chapter 3** show that COBES brings some benefits not only to the rural communities but also to the students and the health facility staff at the rural level. Members of the community opined that through COBES, they see the relevance and importance of health promotion. Students, as part of their learning objectives, give talks on health education and carry out health promotional activities. These activities influence the health seeking behaviour of the community members. As a result, the community members' understanding and awareness of health matters and their knowledge on health issues improves. This has increased the health seeking behaviours in the communities and has encouraged them to visit health facilities to access healthcare leading to a decrease in illnesses among their members. It is important to note that these findings are in line with previous studies conducted among students and community members with respect to the evaluation of COBES and rural outreach programmes.[12,13] The community members further acknowledged that the benefits they gained is as a result of the interaction of the community members and students during their rural outreach programmes. This has empowered them to handle their own health needs and also has allowed them to advocate for better health services to improve on the quality of life of their members.

Our findings again demonstrate that students acquired some benefits from their COBES activities. The rural community serves as an authentic learning environment that typically resembles what student will encounter later in their professional life. It should be noted that learning is situated in a specific context and embedded within a particular social or physical environment and professionals learn from participating in, and gradually being absorbed into the community of practice.[14] Rural training sites are ideal locations for students to confront the array of social, political and economic forces underlying ill health in the society.[15] During COBES, the students are able to adjust and adapt to rural lifestyle and this makes them able to cope with living in the rural communities. In this way, they get acclimatised to the living conditions in the rural areas and this eventually minimises the shock when they are eventually sent back as doctors to similar communities to work after graduation. The students become part of the community, interacting with every member of the community through their health promotion activities and also with the health facility staff. This helps them in building their social skills and teamwork attitude. Through their work in the health facilities and also their interaction with the health facility staff, they see a variety of different diseases and also get the chance to practice some of the skills learnt during their skills training in the laboratory on real patients. This assists them to improve on their clinical skills and also their knowledge base of different types of diseases.

During COBES, the students use the community as a learning environment and as they interact with community members and health experts in the community, this provide them with real opportunities for role modelling and socialisation too. The importance of role models in influencing career choice has been reported in some studies in Sub-Saharan Africa.[16] When students experience early and sustained exposure to rural communities and to rural physician role models, their willingness to practice in the rural areas may be influenced.

The presence of the students at the health facilities in the communities bring some benefits to the staff at the health facilities. During the students' rotations in the various units of the health facilities, they support the staff of the health facilities in sorting and filling out-patients cards, going together with the staff on outreach activities for immunisation, help in dispensing medicine at the pharmacy and conduct test at the laboratory. Through these activities at the health facilities, the students not only learn on the job but also provide service to the facilities, supplement the shortages of health workers and reduce the waiting time for patients, thus addressing some manpower gaps at the health facilities.

The challenges of COBES and what stakeholders and the community could bring on board to improve and sustain COBES are discussed in **Chapter 6**.

Chapter 4

The main research question 1, Will the introduction of an innovative curriculum of PBL with COBES help attract health professionals to the rural areas and also assist to address the inequity of doctors in the rural Ghana, will be answered in **Chapters 4, 5 and 7**.

In **Chapter 4**, we studied the influence of role models during COBES and how this affects student trainees career path. The findings identified personal, teaching and professional attributes that students think would have an impact on their career paths. Students identified hard work, discipline, respect, humility, God-fearing and opened-mindedness, being honest, responsible, approachable, compassionate, and inspiring as the personal attributes they look for in role models. Furthermore, willingness to teach, dedication to teaching and having a good understanding of students' learning difficulties were reported by students as behaviours they see as excellent teaching role models. The ability to interact professionally with patients and students alike, show compassion for the sick and help build a professional identity are some of the professional attributes valued by students. The above-mentioned attributes identified

in the study were the qualities students valued in persons they observed and perceived as role models during COBES.

These findings in this study are supported by previous research about role models in medical education which had identified personal qualities, teaching skills and clinical competence as the critical variables in the choice of role models by medical students.[17]

A role model during COBES coaches, mentors, and helps prepare medical students towards choosing a professional career, and this assist to shape the students' professional identity, create awareness of their professional responsibility and their entry into the work place as doctors.[17]

The uniqueness of these findings is that they add to the paucity of the available literature on the attributes of good role models in medical education from the perspective of sub-Saharan Africa on the influence of role models during COBES in the rural settings.

Additionally, students recognised health workers, community leaders such the assembly members, chiefs and faculty members from the university as persons who could serve as role models in the rural community. Such persons are expected to possess characteristics such as good communication and interpersonal skills, good leadership skills, putting the community's needs first, being sociable and friendly and being team players, as well as having the desire and willingness to work in the rural community. Students admired these categories of persons and learned a lot from them, especially the health workers who are mostly community health nurses and midwives, and also from community members and health experts. These constructive attributes assisted the students to form their own opinions and consequently change their unfounded fears of the rural areas and hopefully may help influence their future career choices. When medical students observe and are mentored by doctors working as primary health care physicians in the rural communities, they are influenced on their choice of specialty and practice location through role modelling, either passively or actively.[18]

In **Chapter 4** students also reported on other attributes that could influence their choices of place of work. The positive attributes that inspired students to want to choose rural areas to work after graduating from medical school included: Encouraging the trainee, demonstrating a favourable attitude toward work in the rural community, displaying a positive attitude for the community, exemplary behaviour, exhibiting profound willingness to work in the rural community, demonstrating commitment for the job despite challenges, and challenging and inspiring trainees.

In **Chapters 5** and **6**, we report on the findings of the influence of COBES on work place choices from the perspective of graduates.

Chapter 5

There is evidence from the international literature that students from rural background are more likely to opt for rural medical practice than their peers from the cities.[19-23] However, the findings in **Chapter 5** showed that a majority of the graduates from the cities *and* urban areas indicated that they were willing to work in the rural area. These are graduates who have had rural exposure during their early years and throughout their medical training. The study showed that when students from the cities and urban towns have part of their training in the rural communities it has an influence on their practice location and choice of specialty. This is in line with a previous study from Australia where graduates who had followed a parallel rural community program revealed that their one-year academic rural experience had influenced them to undertake a rural career path, despite their city-based upbringing.[24] The findings also showed that the decision of the graduates to accept to work in the rural communities stemmed from the absence of human resources and the need to help the communities overcome some of their health problems. Furthermore, the fact that graduates take notice of the poverty levels in the communities and the need to help the less privileged to get access to quality and equity health care also accounted for their desire to work in the rural areas.

Chapter 6

The findings in **Chapter 6** showed that a majority (74%) of the doctors who participated in the study reported that their present location in the rural areas was a result of their respective medical schools adequately preparing them for rural practice. The majority (63%) of the doctors surveyed were alumni of UDS-SMHS, which uses COBES as part of the medical training curriculum where students are exposed to the rural areas early in their training. This is consistent with several studies which have reported that graduates have indicated that the undergraduate COBES experience has influenced their present practice location.[3,6,8-11]

Besides, the vast majority of respondents indicated that they were drawn to rural practice by the desire to acquire more clinical skills and experience. They further alluded to the fact that by working in the rural areas they would gain more confidence and subsequently, become more professionally independent. Acquiring experience, clinical skills and professional independence have been cited in the international literature as some of the reasons why doctors opt for rural practice.[4,25-28]

Though doctors chose to work in the rural communities at their own free will, they were negatively challenged by inadequate infrastructure and social amenities in the rural areas. Participants observed that social barriers, access to resources, educational challenges, family and cultural-related factors were some of the deterrents that negatively affected doctors from choosing to practice in the rural communities. The doctors cited lack of good schools for their children, poor road network and transportation, poor accommodation, poor internet facilities and accessibility among others as the social barriers that potentially deter future doctors from accepting rural postings.

Other deterrents that prevented doctors from accepting to work in rural areas included lack of the necessary equipment, financial and material resources in most of the health facilities. Lack of career progression opportunities was also a prominent finding of this study. Most of the doctors also indicated that they experienced difficulties in finding a replacement when they wanted to pursue further studies. This they observed was due to a lack of awareness among potential candidates of the benefits of rural practice. In a similar vein, language barriers, unpreparedness for life in remote areas and being isolated from families were some of the family and cultural deterrents that prevented doctors from choosing rural practice. The international literature is quite unanimous with respect to the above-mentioned deterrents, particularly as pertains to low-and middle-income countries, which adversely affect the recruitment and retention of health workers in remote and difficult to reach communities.[4,25,29-31]

To overcome some of the challenges adversely affecting the recruitment and retention of health workers in the rural areas, participants made a number of suggestions that could improve the desire to accept rural postings. Most of the participating doctors in the study advocated the Government, Ministries of Health and Education, as policy formulators and implementors, to offer sponsorship packages to medical graduates in the rural areas wishing to pursue postgraduate training and also make rural rotation compulsory for all medical officers. Moreover, the sending of medical students to the rural areas during their training should not only constitute an *integral part* of the curriculum to offer them rural rotation but also when instituted, should be of *significant duration* to sufficiently aid the acclimatisation process. Again, participants were of the view that schools, hospitals and national authorities should join forces in order to increase the number of accredited hospitals in each region. By sending senior specialists and consultants to some of the district hospitals, the Ministry of Health could help raise quality of standards in these institutions, making them eligible for accreditation for training. Participants strongly called on these authorities to reinvigorate existing national policies, make them attractive and enforceable in order to attract and retain doctors in the rural communities in Ghana.

Chapter 7

In **Chapter 7**, we discussed the findings of trainees' preferences regarding the place of work *after* being trained as doctors using either a traditional or a PBL/COBES curriculum.

The findings showed that students from University of Ghana School of Medicine and Dentistry (UGSMD) who are trained with a limited rural outreach programme, believed that it will be useful having part of their training in the rural communities. They perceived that training in the rural areas would prepare them for future rural practice, give them the opportunity to understand the determinants of health in the rural area and broaden their knowledge base and clinical skills. They also observed that rural exposure will help them develop empathy towards people living in rural communities. These observations have been acknowledged by UDS-SMHS students not only in this study but also in other previous studies regarding the usefulness of COBES as an integral part of their undergraduate curriculum.[32]

Interestingly, UDS-SMHS students agreed that the rural exposure as part of their training gave them a fair idea of what goes on regarding the health of the people, understand rural lifestyle and the living conditions in the rural areas. This exposure as part of the curriculum adequately prepares them for rural practice after graduation. However, students from UGSMD indicated that lack of rural experience during their medical school training would deter them from wanting to work in the rural communities after graduation. Some studies have indeed shown that medical schools that have a rural oriented curriculum and offer a repeated rural experience to their students are more successful in graduating doctors who choose rural practice as a career.[11,33-36] The findings in this chapter revealed that the type of curriculum used by medical schools may have an effect on the preparedness of students to choose rural practice after graduation.

As a way of improving the undergraduate medical curriculum which incorporates COBES, UDS-SMHS students listed the following strategies: proper orientation of students about COBES, selection of well-resourced and well-equipped health centres, scheduling and executing regular monitoring and supervisory visits and orientation of the staff of health facilities on the objectives of COBES. However, students from UGSMD wanted the introduction of community-based education activities such as rural outreach programmes so as to improve the undergraduate curriculum in the direction of rural training. Besides, UGSMD students were of the view that to improve rural practice, medical education in Ghana should incorporate innovative teaching methodologies that incorporate rural outreach programmes as part of a general curriculum.

The findings of the study in this Chapter also revealed that students who had lived in a rural area prior to entering medical school were four times more likely to accept to work in the rural area after graduation than those from the city. This finding was consistent with all other studies in the international literature[19,23,37] that students of rural background are more likely to opt for rural practice after their medical training. With this finding, it would be prudent for Ghana to consider students with rural background during the selection and admission process of candidates into the medical schools.

Finally, as has been reported in other similar studies conducted in other countries[8,11,19], our findings showed that male students were one-and-half times more likely to indicate that they were willing to work in the rural area after graduation as compared to their female counterparts. This suggest that COBES has more influence on males than females. Some potential explanations are that females have stronger ties with, as well as more responsibilities towards their families and therefore are unable to travel far away, they are unwilling to work alone in rural areas except if accompanied by their husbands, their inability to keep two separate homes, and the unavailability of good schools in the rural areas for their children.

Strengths and limitations of studies in this thesis

The strengths and limitations emanating from the design and methodology of the various studies have been discussed in the individual chapters of this thesis. Hence, here we look at the more general strengths and limitations.

The general strength of this thesis is that it addresses relatively new and contemporary issues in medical education related to exploration of an educational intervention that has the potential of addressing the abnormal distribution of medical workforce. The thesis comes at a time when community-based education continues to spread around the world, in the changing face of undergraduate medical curriculum incorporating innovative learning environment that presents authentic, real-life contexts for learners. This new approach of using the rural communities as an authentic learning environment is aimed at training health workers with considerable knowledge and skills to work effectively in both rural and urban areas. The recruitment and retention of health workers in the rural community in Sub-Saharan Africa has been a big challenge and most countries have implemented a number of strategies to help solve this rural-urban disparity of the medical workforce. The findings outlined in thesis and similar findings from the international literature provide evidence for addressing the challenges of rural medical workforce through the use of COBES and other rural outreach programmes.

Nonetheless, there are several limitations associated with the work presented here that relate to methodology, research design and sampling. The methodology applied in the studies was of cross-sectional nature, meaning a strategy that make it difficult to determine causality, explanatory mechanisms or direction of the associations. A longitudinal design would have made it possible to draw informed conclusions of changes over time for the same cohort of participants.

The context in which the studies were conducted also constitutes an important limitation. The findings of most of the studies predominantly originated from one institution, in one region and from one country that made it difficult to generalise them. Also, the studies in this thesis used surveys and semi-structured open-and close-ended questions for self-reporting of the views and opinions of medical students and to some extent graduates. Self-reports are subject to social desirability bias as well as recall bias. However, the responses provided by the participants allowed them to fully expressed their opinions and perspective and also the used of validated items in the questionnaire might have minimise the social desirability biases. Finally, the studies were carried out by staff of the School of Medicine and Health Sciences who have displayed the passion and positive attitude towards COBES and this could have created some bias.

Suggestions for further research

It is important for further research to focus on the use of a large cohorts of students from *all* the medicals schools in Ghana. Furthermore, it would be desirable to replicate these studies in different contexts and settings to elaborate further the generalisability of our findings. We recommend that future studies should use a longitudinal design on two separate cohort of students, one cohort admitted into medical school from rural background and the other from the cities and to evaluate their perceptions of the influence of COBES on rural practice as they progress from year one to six to make it possible to draw informed conclusions about the changes of their perception over time

In the future, we hope to develop a community-based clerkship programme that is assumed to optimally enhance student involvement in a community of practice. Again, we aspire to develop a full Longitudinal Integrated Clinical Clerkship (LICC) in a rural area, i.e. a clerkship in which students go to a rural area for a longer period or stay in the same setting for a longer period. Create a prototype optimal learning environment, implement LICC and subsequently investigate its effects on graduates' choice of specialty and practice location.

Implications for educational practice

There is a strong suggestion from this thesis that all health professions training institutions in Ghana and Sub-Saharan Africa should critically review their current undergraduate curricula and incorporate community-based education and service and other rural outreach programmes to prepare trainees to adequately address community health needs. The integration of COBES as part of the undergraduate medical curriculum helps prepare the medical workforce to adapt to rural lifestyle, appreciates rural health needs and the living conditions in the rural areas. This, consequently and adequately prepares them to readily accept to work in the rural areas after graduation.

In addition, the selection of students with rural background to study in medical schools in general has proven to have merits on medical students' willingness to accept to work in the rural communities after graduation. Medical schools are impressed upon to seriously consider reserving a percentage of slots for admission into the medical programmes for students with rural background, since this could eventually lead to increased recruitment and retention of doctors to the rural communities.

This thesis also suggests that the Government, Ministries of Education and Health, based on the evidence presented, should develop a national policy on rural posting. This policy should be directed towards improving of district health facilities as centres for internship training and rural rotation for medical doctors. This may pave the way for some kind inter-university working group in the of medical education.

Finally, the quality of healthcare at the district level is poor due to inadequate human and material resources. The Ministry of Health should therefore raise the quality and standards of healthcare at the district hospitals by sending senior specialists and consultants to these facilities; this would make them eligible for accreditation for internship training and also training of various specialists. The accreditation of these institutions for rural rotation of medical doctors will help solve the service or manpower gaps in these areas. Furthermore, the presence of the senior specialists and consultants in the district hospitals will also enable them to serve as role models for student trainees going to these institutions, thus influencing the trainees' chances of choosing to work in the rural areas after their graduation from medical school.

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Summary

Summary

The overall aim of this thesis was to investigate the influence of Problem-based learning (PBL) with Community-based education and service (COBES) as part of an undergraduate medical curriculum on specialty and rural workplace choices. The thesis investigated the contribution of COBES in helping to address the mal-distribution of medical workforce in the rural areas in Ghana specifically and sub-Saharan Africa in general.

Introduction

An important challenge for today's higher education is the development and implementation of instructional practices that will allow students acquire and apply the skills and knowledge they attain efficiently. The expectation of society in contemporary higher education is that graduates should have, not only a robust knowledge base, but also be able to apply this knowledge to solve problems in an efficient way.

Many educational innovations have been implemented with the hope of achieving to teach students the necessary knowledge base, and habit technical and non-technical skills to address the expectation of contemporary society.

Such educational innovations included, for example, the introduction of Problem-Based Learning (PBL) methodology and Community-Based Education and Service (COBES). COBES prepares health professionals to address the health needs of a community. The emphasis is on health promotion and disease prevention, not treatment; the focus is on populations rather than individuals.

Community-Based Education and Service, which has nowadays become widely accepted as an important innovation in undergraduate medical training, was at the time of its introduction considered as one among many the educational intervention to address local, rural community health needs, so its importance at the time is clearly acknowledged in contemporary medicine

The Chapters in this thesis provide answers to the general research questions: 1) Will the introduction of an innovative curriculum such as PBL with COBES help attract health professionals to the rural areas and also assist in addressing the inequity of doctors in the rural Ghana? 2) a) what benefits does COBES bring to the community, students and staff of the health facilities b) what are the challenges of COBES to stakeholders and c) what contribution of other stakeholders together with the community to improve and sustain COBES for the mutual benefits of both.

In the Chapters we present findings obtained from both qualitative and quantitative research performed from 2013 to 2018 that provided insights into the benefits of COBES and rural outreach programmes to the rural community, students and other stakeholders in that community.
A brief summary of the different Chapters is consecutively presented below.

Chapter 1

The introductory Chapter of this thesis outlined a detailed historical background of medical education from the pre-Flexner period of apprenticeship model of medical training, the Flexner era of biomedical approach to medical training and a new approach integrating community-oriented medical education. It looked at the expectations of society in contemporary higher education with the view that medical graduates would possess adequate knowledge and skills to address the needs of the population it serves. The Chapter subsequently introduced the theme of Problem-Based Learning/Community-Based Education and Service in undergraduate medical education. Furthermore, it outlined the theoretical underpinning of PBL and COBES from the field of socio-constructive and social learning theories
Finally, an overview of the literature on the importance of rural outreach programmes based on evidence of previous studies from the developed and the developing world were also presented. In short, the international literature provides evidence of the influence of COBES and other rural outreach programmes in addressing the disparity of medical workforce in remote communities. However, the evidence from the settings of the developed countries may not be generalisable enough to the settings of sub-Saharan Africa to design educational interventions to address the mal-distribution of rural workforce in sub-Saharan Africa. These findings provided the basis and justification for the studies on COBES summarised in the next sections.

Chapter 2

In Chapter 2 we presented a systematic literature review of studies conducted in Africa and published in peer-reviewed journals on the role of COBES and rural outreach programmes in addressing the disparity of rural-urban medical workforce. The review identified only 18 published peer-reviewed articles from Uganda, South Africa, Ghana, Nigeria, Tanzania, Democratic Republic of Congo and Botswana. The already small number of published articles was furthermore limited to a few countries in Africa, thus making research output from this geographic area woefully inadequate. Most countries

in Africa are yet to embrace COBES and rural outreach programmes as an important educational intervention to train doctors and other health professionals, who are willing and able to work in remote areas of the country. It is also important to note that there is cumulative evidence from the few African countries that have incorporated COBES and rural outreach programmes as part of the undergraduate medical curriculum which has shown that exposing students to the rural areas as part of their training positively affects their eventual practice location. Studies from these countries point to the fact that training health profession students in the rural community could bring equity in the distribution of health professionals to the benefit of the rural people.

Chapter 3

The findings in Chapter 3 revealed the usefulness and benefits of COBES to the rural community, students and staff of the health facilities. The community members have acknowledged that benefits such as the improvement of their understanding and awareness of health matters, the increase in their health seeking behaviours were a result of the community members' interactions with the students during the rural outreach programme.

The students opined that the rural communities serve as an authentic learning environment where they were confronted with various kinds of diseases and that they also had the opportunity to "practice" some of the skills learnt in medical school on real patients. This, they said assisted them to improve on their clinical skills and also their knowledge base of different types of diseases. They also indicated that the rural rotation was beneficial to them in that they were able to adjust and adapt to rural enabling them to cope with living in the rural communities. In this way, they get acclimatised to the living conditions in the rural areas and this eventually minimises the shock of transition when they are eventually sent back as doctors to similar communities to work after graduation.

The staff of the health facilities do benefit from services provided by the students at these facilities. In practice, the students, assume the role of health staff by complementing the shortages of health workers at the health facilities and reducing the waiting time for patients, thus addressing some of the manpower gaps at the health facilities.

Chapter 4

In Chapter 4, we discussed the findings of the influence of role models during COBES and how this affects student trainees' career paths. The findings in this chapter showed that students identified personal, teaching and professional attributes that they think would have an impact on their career paths. These were the attributes and qualities identified by the students they valued in persons they observed and perceived as role models during COBES. In general, a role model during COBES coaches, mentors, and helps prepare medical students towards choosing a professional career, and this assists to shape the students' professional identity, create awareness of their professional responsibility and their entry into the work place as doctors.
Students identified health workers, community leaders such the assembly members, chiefs and faculty members from the university as persons who could serve as role models in the rural community.

Chapter 5

In Chapter 5, we discussed the results of the effect of COBES on medical graduates' choice of specialty and their willingness to work in the rural areas of Ghana. The findings of this study showed that when students from the cities and urban towns are exposed early to COBES during their medical training, they develop the willingness to work in the rural areas despite their city upbringing. During their stay in the communities, they observe the poverty levels in the communities and the difficulties less privileged members of the community face in accessing quality healthcare. These account for the desire of the graduates to help the communities to improve upon the status of the healthcare system.

Chapter 6

Chapter 6 focused on the factors that influence medical doctors to practice in the rural areas of Ghana. The findings of this study indicated that medical doctors choose to practice in the rural areas because they want to acquire more skills and experience. Furthermore, most of the doctors, especially those trained at UDS-SMHS indicated that their undergraduate medical curriculum prepared them well for rural practice. However, they indicated that social barriers, access to resources, educational challenges, family and cultural-related factors were some of the deterrents that negatively affected doctors from choosing to practice in the rural communities. They

made suggestions to improve and sustain COBES by calling on the Government, Ministries of Health and Education to offer sponsorship packages to medical graduates in the rural areas wishing to pursue postgraduate training. Also, they urged the Government to send senior specialists and consultants to some of the district hospitals, so as to make the district hospital eligible for accreditation for training medical officers.

Chapter 7

In Chapter 7, we discussed whether trainees' preferences regarding the place of work is influenced by the type of curriculum used in their training. The findings showed that students from University of Ghana School of Medicine and Dentistry (UGSMD), though trained with a limited rural outreach programme, believed that it would be useful in having part of their training in the rural communities. The students from UGSMD, however, indicated that lack of rural experience during their medical school training would deter them from wanting to work in the rural communities after graduating. The students from UDS-SMHS suggested that rural exposure as part of the curriculum adequately prepared them for rural practice after graduating.
As a way of improving the undergraduate medical curriculum which incorporates COBES, students from UGSMD requested the introduction of community-based education activities such as rural outreach programmes to improve the undergraduate curriculum. However, UDS-SMHS students listed strategies such as proper orientation of students about COBES and selection of well-resourced and well-equipped health centres as a way of improving the already implemented rural training.

Chapter 8

In Chapter 8, a general discussion of the findings of the different studies addressing the research questions formulated in chapter 1 is provided making references to relevant literature and how they contribute in answering the research questions. Conclusions are drawn thereafter; the strengths of the studies highlighted, and limitations of the studies identified. In addition, the Chapter ends with suggestions for further research and implications for practice.

Samenvatting

Samenvatting

Het algemene doel van dit proefschrift was om te onderzoeken welke invloed Probleemgestuurd Onderwijs (PGO) in combinatie met gemeenschapsgericht(e) onderwijs en dienstverlening (COBES)* binnen een curriculum van de bachelor Geneeskunde heeft op de keuze van specialisme en om op het platteland te werken. Het proefschrift onderzocht welke bijdrage COBES levert aan de aanpak van de ongelijke spreiding van medisch personeel op het platteland in sub-Sahara Afrika en in het bijzonder in Ghana.

Introductie

Een belangrijke uitdaging voor het hoger onderwijs van vandaag de dag is om onderwijspraktijken te ontwikkelen en in te voeren die studenten in staat stellen de kennis en vaardigheden die zij opdoen op efficiënte wijze aan te leren en toe te passen. De eis die de samenleving stelt aan het hedendaagse hoger onderwijs is dat afgestudeerden niet alleen een gedegen kennisbasis moeten hebben, maar ook in staat moeten zijn deze kennis in te zetten voor het op efficiënte wijze oplossen van problemen.

Er zijn veel onderwijsvernieuwingen ingevoerd met de hoop studenten de nodige kennisbasis te geven, alsook de technische en niet-technische vaardigheden die hen in staat stellen aan de eisen van hedendaagse samenlevingen te voldoen.

Voorbeelden van zulke onderwijsvernieuwingen zijn de introductie van de Probleemgestuurd-Onderwijs-(PGO)-methode en gemeenschapsgericht(e) onderwijs en dienstverlening (COBES). COBES traint zorgprofessionals om aan de zorgbehoeften van een gemeenschap te beantwoorden. De nadruk ligt daarbij niet op behandeling, maar op gezondheidsbevordering en ziektepreventie; ook ligt de nadruk op bevolkingsgroepen in plaats van op individuen.

COBES, wat tegenwoordig algemeen aanvaard wordt als een belangrijke vernieuwing in de bacheloropleiding Geneeskunde, werd ten tijde van de introductie beschouwd als een van de vele onderwijsinterventies die ten doel hadden aan de zorgbehoeften van de lokale en plattelandsgemeenschap te beantwoorden; het belang van destijds wordt dus duidelijk erkend in de hedendaagse geneeskunde.

De Hoofdstukken in dit proefschrift geven antwoord op de algemene onderzoeksvragen: 1) Zal de introductie van een vernieuwend curriculum zoals PGO in combinatie met COBES helpen om zorgprofessionals naar de plattelandsgebieden te trekken en ook bijdragen aan de aanpak van de ongelijke spreiding van artsen in landelijk Ghana? 2a)

Welke voordelen heeft COBES voor de gemeenschap, studenten en stafleden van de zorginstellingen? 2b) Welke uitdagingen brengt COBES met zich mee voor de betrokkenen? 2c) Hoe dragen betrokkenen in samenwerking met de gemeenschap bij aan de verbetering en de instandhouding van COBES waar zij beiden belang bij hebben?
In de Hoofdstukken van het proefschrift presenteerden we bevindingen die we verkregen uit zowel kwalitatief als kwantitatief onderzoek dat van 2013 tot 2018 is uitgevoerd en dat inzicht bood in de voordelen van COBES en plattelands-hulpverleningsprogramma's voor de plattelandsgemeenschap zelf, studenten en andere betrokkenen in die gemeenschap.
Hieronder worden de verschillende Hoofdstukken achtereenvolgens kort samengevat.

Hoofdstuk 1

Het inleidend Hoofdstuk van dit proefschrift gaf een gedetailleerd overzicht van de geschiedenis van het medisch onderwijs, van de periode vóór Flexner's leermeester-gezelmodel van medisch opleiden tot het Flexner-tijdperk waarin de biomedische benadering van medisch opleiden centraal stond en een nieuwe benadering waarbij gemeenschapsgericht medisch onderwijs geïntegreerd wordt. Laatstgenoemde keek naar de eisen die de samenleving stelt aan het hedendaagse hoger onderwijs met het idee dat afgestudeerde basisartsen in dat geval over voldoende kennis en vaardigheden zouden beschikken om aan de behoeften van de bevolking die zij zouden dienen, tegemoet te komen. Vervolgens introduceerde het Hoofdstuk het thema van Probleemgestuurd Onderwijs/ gemeenschapsgericht(e) onderwijs en dienstverlening in de bacheloropleiding Geneeskunde. Voorts beschreef het de theoretische onderbouwing van PGO en COBES vanuit de sociaal-constructieve en sociale leertheorieënvelden.
Ten slotte werd een overzicht gegeven van de literatuur over het belang van plattelandshulpverleningsprogramma's dat met bewijs van voorgaande studies uit ontwikkelde en ontwikkelingslanden werd gestaafd. Kortom, de internationale literatuur levert bewijs dat COBES en andere plattelandshulpverleningsprogramma's de ongelijke spreiding van medisch personeel in afgelegen gemeenschappen helpen aanpakken. Het is echter mogelijk dat het bewijs uit de ontwikkelde-landen-settings niet voldoende generaliseerbaar is naar de settings van sub-Sahara Afrika om daar de ongelijke spreiding van medisch personeel in de subregio aan te pakken. Deze bevindingen vormden de basis en rechtvaardiging voor de studies over COBES zoals in de volgende alinea's wordt samengevat.

Hoofdstuk 2

In Hoofdstuk 2 presenteerden we een wetenschappelijk literatuuronderzoek van in Afrika verrichte en in ‘’peer-reviewed” tijdschriften gepubliceerde studies over de rol van COBES en plattelandshulpverleningsprogramma’s bij het recht trekken van de wanverhouding tussen het medisch personeel op het platteland en in de steden. Het onderzoek vond slechts 18 gepubliceerde van dergelijke artikelen, en wel uit Oeganda, Zuid-Afrika, Ghana, Nigeria, Tanzania, de Democratische Republiek Congo en Botswana. De onderzoeksoutput uit dit geografische gebied is dus volstrekt ontoereikend. De meeste landen in Afrika moeten COBES en plattelandshulpverleningsprogramma’s nog accepteren als een belangrijke onderwijsinterventie waarmee artsen en andere zorgprofessionals opgeleid kunnen worden opdat zij bereid en in staat zijn in afgelegen gebieden van hun land te werken. Het is ook van belang te vermelden dat het bewijs uit de paar Afrikaanse landen die COBES en andere plattelandshulpverleningsprogramma’s wel in het bachelor-Geneeskunde-curriculum hebben opgenomen, dat dergelijke programma’s een positieve invloed hebben op de locatie waar de studenten in de toekomst uiteindelijk werkzaam zullen zijn, zich opstapelt. Studies uit deze landen wijzen op het feit dat het opleiden van gezondheidszorgstudenten in de plattelandsgemeenschap de ongelijke spreiding van zorgprofessionals recht kan trekken waar de plattelandsbevolking voordeel bij heeft.

Hoofdstuk 3

De bevindingen in Hoofdstuk 3 lieten zien wat het nut en de voordelen waren van COBES voor de plattelandsgemeenschap, studenten en stafleden van de zorg-instellingen. De gemeenschapsleden gaven aan dat voordelen zoals een verbeterd begrip en bewustzijn van gezondheidszaken en een toename in hun ziektegedrag een gevolg waren van hun interacties met studenten tijdens het plattelandshulpverlenings-programma.

De studenten waren van mening dat de plattelandsgemeenschappen als authentieke leeromgeving dienden waarbinnen zij met allerlei ziekten werden geconfronteerd en dat zij ook de kans kregen om enkele van de tijdens de geneeskundeopleiding opgedane vaardigheden te “oefenen” op echte patiënten. Volgens hen hielp dit hen om hun klinische vaardigheden, evenals hun kennisbasis van de verschillende soorten ziekten te verbeteren. Ook gaven ze aan dat de praktijkervaring op het platteland nuttig voor hen was omdat zij zich daardoor leerden aan te passen aan het leven op het

platteland, wat ertoe leidde dat zij het leven onder de plattelandsgemeenschappen beter aan konden. Op deze manier raakten zij gewend aan de leefomstandigheden op het platteland, wat op den duur de overgangsschok verkleint wanneer zij na het afstuderen teruggezonden worden naar vergelijkbare gemeenschappen om daar als arts te werken.
Ook de stafleden van de zorginstellingen hadden baat bij de diensten die de studenten verleenden in deze instellingen. In de praktijk namen studenten de rol van gezondheidswerker op zich door tekorten aan gezondheidswerkers in de zorg-instellingen aan te vullen en de wachttijd voor patiënten te verkorten. Daarmee hielpen zij een deel van het tekort aan arbeidskrachten in de zorginstellingen op te vangen.

Hoofdstuk 4

In Hoofdstuk 4 bespraken we de bevindingen ten aanzien van de invloed van rolmodellen tijdens COBES, en hoe zij het verdere loopbaantraject van studenten/ aiossen kunnen beïnvloeden. De bevindingen uit dit hoofdstuk laten zien dat studenten persoonlijke, didactische en professionele eigenschappen onderscheidden waarvan zij dachten dat deze van invloed zouden zijn op hun loopbaantraject; met andere woorden, eigenschappen en kwaliteiten die door studenten als waardevol werden aangemerkt en die zij hadden waargenomen in mensen die zij tijdens COBES hadden geobserveerd en als rolmodel beschouwden. Over het algemeen is een rolmodel tijdens COBES zowel coach als mentor en helpt hij/zij geneeskundestudenten zich voor te bereiden op hun latere loopbaankeuze, wat studenten weer helpt hun professionele identiteit vorm te geven, hen bewust te maken van hun professionele verantwoordelijkheid en hun intrede te maken als arts op de werkplek.
Studenten gaven aan dat gezondheidswerkers, gemeenschapsleiders zoals leden van de assemblee, hoofden en faculteitsleden van de universiteit als rolmodel konden dienen in de plattelandsgemeenschap.

Hoofdstuk 5

In Hoofdstuk 5 bespraken we de resultaten betreft de invloed van COBES op de specialismekeuze van afgestudeerde basisartsen en hun bereidheid om op het platteland van Ghana te werken. De bevindingen van deze studie toonden aan dat wanneer studenten uit de steden en grotere gemeenten al vroeg in de geneeskundeopleiding worden blootgesteld aan COBES, ze de bereidheid ontwikkelen om in de plattelandsgebieden te werken, ondanks hun stedelijke opvoeding. Tijdens

hun verblijf in de gemeenschappen aanschouwden zij het armoedeniveau en de moeilijkheden die de kansarmere gemeenschapsleden ondervonden bij het ontvangen van kwalitatief goede zorg. Dit verklaart waarom afgestudeerden de wens hadden om de gemeenschappen te helpen de status van het zorgstelsel te verbeteren.

Hoofdstuk 6

Hoofdstuk 6 richtte zich op de factoren die artsen inspireren om op het platteland van Ghana te gaan werken. De bevindingen van deze studie gaven aan dat artsen ervoor kiezen om in de plattelandsgebieden te werken omdat ze meer vaardigheden en ervaring willen opdoen. Voorts gaven de meeste artsen aan, met name diegenen die aan de *School of Medicine and Health Sciences* van de *University for Development Studies* (SMHS-UDS) waren opgeleid, dat hun bachelor-Geneeskunde-curriculum hen goed had voorbereid op het werk op het platteland. Ze gaven echter ook aan dat sociale drempels, toegang tot voorzieningen, geringe loopbaankansen en familiale en culturele overwegingen factoren waren die artsen ervan weerhielden om uit eigen wil in de plattelandsgemeenschappen te gaan werken. Ze deden enkele suggesties voor de verbetering en instandhouding van COBES aan het adres van de overheid en Ministeries van Gezondheid en Onderwijs, zoals het beschikbaar stellen van beurzen aan afgestudeerde basisartsen die graag hun vervolgopleiding in de plattelandsgebieden willen doen. Ook pleitten ze ervoor dat de overheid ervaren artsen en specialisten naar enkele districtsziekenhuizen zendt, zodat het opleidingsprogramma van artsen in deze ziekenhuizen in aanmerking kon komen voor accreditatie.

Hoofdstuk 7

In Hoofdstuk 7 bespraken we of de voorkeuren van AIOSsen ten aanzien van de locatie van hun vervolgopleiding beïnvloed wordt door het soort curriculum dat in hun opleiding werd gebruikt. De bevindingen lieten zien dat studenten van de *Ghana School of Medicine and Dentistry* aan de Universiteit van Ghana (UGSMD), ook al hadden zij een beperkt plattelandshulpverleningsprogramma gevolgd als onderdeel van hun opleiding, van mening waren dat het nuttig was om een deel van hun opleiding in de plattelandsgemeenschappen door te brengen. De studenten van de UGSMD gaven echter aan dat zij na hun afstuderen niet in de plattelandsgemeenschappen hadden willen werken als zij tijdens hun studie geen ervaring op het platteland hadden opgedaan. De studenten van de SMHS-UDS waren het ermee eens dat blootstelling aan

het platteland als onderdeel van het curriculum hen goed voorbereidde op het werk op het platteland na hun afstuderen.
Om het curriculum van de bacheloropleiding Geneeskunde waar COBES een onderdeel van vormt te verbeteren, vroegen de studenten van de UGSMD om de introductie van gemeenschapsgerichte onderwijsactiviteiten zoals plattelandhulpverlenings-programma's. De studenten van de SHMS-UDS suggereerden echter strategieën ter verbetering van de al bestaande plattelandsprogramma's, zoals het goed voorlichten van studenten over COBES en het kiezen van goed toegeruste en goed geëquipeerde gezondheidscentra.

Hoofdstuk 8

In Hoofdstuk 8 volgt een algemene discussie van de bevindingen van de diverse studies die een antwoord geven op de in hoofdstuk 1 geformuleerde onderzoeksvragen, waarbij verwezen wordt naar relevante literatuur en uitgelegd wordt hoe deze referenties helpen de onderzoeksvragen te beantwoorden. Vervolgens worden conclusies getrokken, de sterke punten van de studies belicht en de beperkingen van de studies in kaart gebracht. Het Hoofdstuk wordt ten slotte afgesloten met aanbevelingen voor vervolgonderzoek en gevolgen voor de praktijk.

Valorisation

Valorisation

This Chapter will touch upon the return of investment prospects for society from the knowledge gathered from this PhD thesis. Consecutively, the social, educational and economic relevance are discussed, followed by the target groups of the results of this thesis, an explanation of its innovative character and a plan of dissemination of the finding of the studies in this thesis.

According to Danbenton, medical education can only be considered excellent if it is responsive and relevant to local community needs. The social accountability of Community-Based Education and Service (COBES) is its ability to impact on the training of healthcare professionals to acquire professional competencies in a rural community setting focusing on population groups and also individuals and their everyday problems as well as providing service that meets identified community needs. 'Social accountability is the obligation to direct education, research, and service activities towards addressing the priority health concerns of the community, region, and/or nation they have a mandate to serve'

Social relevance

The social relevance of this thesis cannot be overemphasised as it centres on the role of COBES in addressing the challenges of recruitment and subsequent retention of healthcare professionals in the health sector in Ghana and sub-Sahara Africa in general. These challenges have led to manpower shortages resulting in poor health care quality for the rural communities. Furthermore, through COBES there is the creation of social capital for social accountability to the community. There is growing evidence that involving community members in planning, developing, implementing and evaluating health programmes in their own communities go a long way to bring success and sustainability of such programmes.[1] During their training in the community, students learn about social and economic aspects of illness, about health services in the community and methods of health promotion, about working in teams and the types of problems encountered outside a hospital setting. The trainees engage in service provision such as giving health educational talks at the community schools, sorting and filling out-patient cards, helping to dispense medicines at the pharmacy, and going for outreach activities for immunization purposes. Through these activities in the community, trainees not only learn but also provide service to the community, thus addressing some manpower gaps of the community. In exposing students to the community as part of their training, they learn, acquire social skills and provide services and through that they may develop the appropriate attitudes towards their studies and future practice. The Problem-Based Learning (PBL) also enables students to learn group

work skills and attitude, and improves their communication skills[2]. These skills and attitudes include team work, cooperation, respect for colleagues' views, chairing a group, and interaction with group members.[2] The interpersonal and communication skills that the students consequently acquire through the PBL process make them effective leaders and provides them with the ability to work with different members of the community.[2]

The theoretical relevance of this thesis is that students learn in the context of social interaction. In the so-called contextual learning, students' learning and thinking are influenced by the physical and social context in which they are immersed or situated (also called social constructivist theory). In COBES, the students use the community as a learning environment. In this regard COBES can also be considered as *situated learning.* COBES provides unique opportunities to learn in an environment that 'typically resembles' what students will encounter in later professional life (contextual learning). COBES provides a chance for elaborating and collaborating on information. Since students will be considered as 'experts' by the community, they will be asked questions, deliver talks about health education, discuss health problems with the community, and try to explain different phenomena observed in the community. *Collaborative learning* assigns learners an active and constructive role in their own learning.[3] Consequently, collaborative learning fits with the constructivist views of learning. PBL as a collaborative learning environment fits well into the theory of social constructivism. In PBL, students collaborate in small groups to achieve common learning goals. Through collaborative learning students develop a critical understanding of the material and integrate new knowledge into their prior knowledge instead of just memorising facts for reproduction. In this way community-based education can enhance learning in much the same way as in problem-based learning. As students work together in the community their knowledge is internalised as a result of their interaction with other stakeholders in the community which serves as a social environment.

Economic relevance

In addition to the above mentioned social and educational relevance of this thesis, there are economic consequences associated with and lessons to be learned from this thesis. So far, the tertiary teaching hospitals have been the predominant sites for the clinical training of doctors. These same tertiary hospitals are also used as the training sites for nurses, midwives, pharmacists and biomedical laboratory scientists. This puts a lot of strain on the facilities at these training sites; this calls for expansion to cater for the increasing demand to double the admission of students into health professional institutions. This requires the often cost-prohibitive nature of building (or rebuilding)

traditional medical school complexes. There is an imbalance of medically overserved versus underserved communities, and the historic 'medical school versus community' disconnect between how and where doctors are trained. This is where community-based education makes the training of health professionals cost effective.[4] The results in this thesis demonstrate some benefits in using the communities as expanded platforms for the training of health professionals, especially doctors. The health facilities are already in existence in the district and rural communities and this presents clinical training opportunities for students. Again, tertiary hospitals often tend to offer exposure to a narrowly specialised patient population, whereas community facilities offer a more realistic mix of patients similar to those that the trainees will encounter after their medical training.

Moreover, these rural facilities will be a destination for a substantial number of medical graduates after their training. The rural rotations therefore present an opportunity for prospective doctors to get acquainted and to bond with rural facilities and the communities they serve. The evidence from the literature shows that medical graduates who are meaningfully exposed to rural community practice during their training are more likely to choose to practice in those communities.[5]

The Ghana Ministry of Health (MoH) implemented a number of incentives (Chapter 2) such as a 20-30% salary top up for health staff in deprived areas (implemented in 2004) and a staff vehicle purchase scheme aimed at limiting the migration of doctors and other health professionals in Ghana towards the cities. This however did not yield the needed results. Therefore, attention must be focused on structured community exposure and community-based education to provide students with experiences working with underserved populations and improve the graduates' preparation to deal with national health problems.[6] A sense of social responsibility develops among the students as they interact with community members. They may opt to practice in the rural areas because of the meaningful exposure to rural practice during medical training, but not necessarily because of financial incentives. This could help government to channel the extra financial resources to improving the health facilities in the rural areas which invariably will serve as an incentive for health professionals, especially doctors to want to practice there.

Target groups

The results of this thesis is of benefit to a number of stakeholders namely: medical students, medical graduates, academic staff, health facility staff, the rural community members and policy implementors. These will be touched upon briefly in the subsequent sections.

The results of this thesis are of relevance to medical students who through COBES are exposed to early patient contact, which helps them improve their communication skills, helps build their clinical and social skills and empowers them in their clinical work. The community serves as a learning environment where students become aware of the needs of the community, inadequate numbers of health personnel in the community, the right of the rural person to quality healthcare and the exposure to different fields in medicine. Again, through COBES students identify and learn from good role models, mentors, coaches, who ultimately help shape their professional career as doctors. COBES helps students get a clear understanding of primary health care settings within the health structure. Having part of the training in the community helps students to make choices as to which areas they want to specialise in and also assists them to develop interest to practice in the rural area after graduation.

This thesis is also relevant to medical doctors in that rural postings afforded them the opportunity to take an active role in patient care, gain experience and hone their clinical skills, and also to ultimately gain professional independence.

The academic community, through its research activities in the community during COBES, will not only gain scholarly promotion through publications but also will use their research findings to improve the organisation and management of COBES and also influence policy implementors to invest in community-based education programmes in order to attract medical doctors to practice in underserved communities.

The staffing level at the health facilities in the rural communities is highly inadequate. The staff are overstretched with the heavy workload in the health facilities. They observe long queues of the community members seeking healthcare at the facilities and they sometimes have to spend the whole day attending to these people compromising on the quality of healthcare. The health facility staff benefit enormously from the presence of the students during COBES. The students engage in service provision such as health educational talks at the community schools during school visits, sort and fill out-patients' cards, help dispense medicines at the pharmacy, participate in outreach activities for immunisation purposes. Through these activities the students provide service to the community, thus addressing some manpower gaps of the community and thus freeing time for the health facility staff to take care of other equally important activities in the facilities.

From the results of this thesis (Chapter 2), the community members acknowledged that the benefits they gained is as a result of the interaction of the community members and students during their rural outreach programmes. Thus, the activities of the students during COBES influenced the health seeking behaviour of the community members. As a result, the community members' understanding and awareness of health matters and their knowledge on health issues improved. This has increased the health seeking behaviours in the communities where the students went and has

encouraged the community members to visit health facilities to access healthcare leading to a decrease in illnesses among the members. This has empowered them to handle their own health needs and also has allowed them to advocate for better health services to improve on their quality of life.

Policymakers and curricula planners should learn from the evidence emerging from COBES and acknowledge that the establishment of COBES and rural outreach programmes as part of health training institutions' curricula to provide rural exposure for students will positively influence doctors to choose rural practice. The Ministries of Education and Health, in collaboration with the communities could improve the inadequate numbers of medical doctors in the rural communities by developing a national policy on rural posting. This Policy could be directed towards making district health facilities as centres for internship training and rural rotation for medical doctors. In addition, the Ministries of Education and Health should encourage medical schools to incorporate rural outreach/practice, such as COBES, in the curricula to engage students in rural practice, thus increasing the likelihood of them accepting rural postings after graduation

Innovation

An important challenge for today's higher education is the development and implementation of instructional practices that will allow students to acquire and apply skills and knowledge efficiently to solve problems in an efficient way.[7-9] Consequently, there is the need to create a learning environment that supports the constructive cumulative, goal-oriented acquisition processes in all students. Again, the environment should use as much as possible representative, authentic, real life contexts that have personal meaning for the learners and offer opportunities for distributed and co-operative learning through social interactions. COBES, which has nowadays become widely accepted as an important innovation in undergraduate medical training, was at the time considered as merely an educational intervention to address local, rural community health needs. In a recent innovation in medical education PBL and COBES have been integrated as different parts of the same undergraduate curriculum. This new approach aims at training a team of health professional graduates with considerable knowledge and skills to work effectively in both rural and urban areas as well as to provide comprehensive healthcare. The idea of implementing an educational design such as PBL and COBES which focus on the underserved rural communities as an approach to solving the problem of too few doctors in the rural areas is very innovative and looks promising.

Activities, products and dissemination

The findings of the studies (Chapters 2, 3, 4 and 5) have resulted in academic publications in international peer-reviewed journals. Abstracts of these studies have been presented at Association of Medical Education in Europe (AMEE) workshop, in Milan, Italy and the 'Towards Unity for Health' conferences in Brazil, Thailand and also at the first AfriHealth international conference held in Accra, Ghana. The visibility of these publications resulted in my being invited to an international workshop and conference on interprofessional education by African interprofessional Education Network (AfriPEN) in Namibia.

Locally, part of the results of the research have already been incorporated into orientation workshops organised for students and new academic staff at the School of Medicine and Health Sciences (SMHS). For broader dissemination of the findings of this thesis, printed copies of the PhD thesis will be sent to key stakeholders in education and health, notably the Ministers of Education and Health, Ghana Education Service (GES) council and the Director-General of Ghana Health Service (GHS). Printed copies will be sent to the Deans of all the medical schools and heads of other health professions institutions in the country. Furthermore, copies of the thesis will be sent to the office of the Vice Chancellor, Pro-Vice Chancellor, the director of quality assurance of the University and the school library. The thesis will also serve as a blue print/working document for the improvement of COBES at SMHS and the Third Trimester Field Practical Programme (TTFPP) of the University. The findings of this thesis will be further disseminated by sending copies to District Directors of some key district hospitals and their education committees. Finally, the Parliamentary Select Committees on Health and Education of the Ghana Parliament will be given copies of this thesis with the hope that it will influence some policy direction in the training of healthcare professionals.

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Acknowledgement

Acknowledgement

Let me start my acknowledgements with this quote from one of the greatest sons of Africa- Nelson Mandela, and I quote: ‘It always seems impossible until it's done’. The PhD trajectory seemed impossible at the start and was even made most unpleasant when I was not allowed to continue with the second phase of my PhD proposal writing. First of all, I will like to give praise and thanks to the Almighty God for giving me the faith to believe in myself that I can make it. Again, to thank our Lord for granting me the strength, knowledge, wisdom, perseverance, hard work and most of all the good health to go through my PhD project.

The completion of my PhD thesis was made possible through team work, collaborative effort, contribution and support of a number of people around me.

I will like to sincerely thank my wife, Christiana Amalba and Kevin Yinne-Nmih Amalba for not only standing by me throughout this journey but also constantly asking questions such as ‘When are you graduating? Are you not keeping too long in your work?’. These words always stirred me up to work harder with my thesis.

I owe my sincere thanks to Geraldine van Kasteren, the first project director of NICHE 082. When I first got the feedback from the director of PhD programmes of Maastricht University that I could no longer continue with the second phase of my PhD proposal writing, she was the first person I poured my frustrations and disappointment on. She was equally shocked but she calmly said, I will talk to Albert and Walther to see if they could guide you to continue with the proposal writing and submit to the SHE as a private candidate. No wonder when Geraldine heard of the approval of my PhD thesis by the assessment committee for public defense in Maastricht, she remarked: ‘Many, many congratulations! You have achieved the almost unachievable! We are very, very proud and you are a great example for many, including myself’. I must say that I enjoyed your company not only working with you as the project director but also the dinners at your house anytime I was in Maastricht. I say thank you very much to you Geraldine!

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Education, Faculty of Health, Medicine and Life Sciences, Maastricht University and, Department of Intensive Care Medicine, Maastricht University Medical Centre, Maastricht, the Netherlands; and Prof. Francis Atindaana Abantanga, MD, Professor of Paediatric Surgery, and Dean, School of Medicine and Health Sciences, University for Development Studies, Tamale, Ghana.

Albert, your guidance in my PhD thesis was very inspiring and I am very grateful for that. Despite your busy schedules you were very accessible and supportive from the very beginning of the proposal writing through to the PhD thesis and to this very end. Your work as my supervisor was not limited to our meetings in Maastricht and Tamale, but whenever we met at an international occasion you still found time for us to discuss my work. I remember our meeting in Milan, Italy, during the AMEE conference. We found time to discuss my work with a cocktail in one of the cafes. You had a good grasp of the general overview of the PhD project and your scholarly suggestions were very insightful which helped me to the final completion of this thesis.

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Francis joined the team later on during my PhD work. Albert, Walther and myself had 'conspired' in Maastricht to include him in the team after Dr. Kofi Owusu-Daaku fell out

of the team. I met Francis in his office and asked him if he would be willing to be part of my PhD project. He just asked one simple question: 'To join in what capacity?' I indicated to him that he will be one of my supervisors for my PhD work. He willing agreed to be my supervisor. Albert and Walther were very happy to hear that Francis was willing to be one of the supervisors. I had known Francis reasonably well when we were students in Kharkov, Ukraine. I was an undergraduate student at the pharmacy school whilst he was pursuing his PhD at the medical school also in Kharkov. We both worked in Yendi hospital in the northern region at different times and I again met Francis at Komfo Anokye Teaching Hospital, Kumasi' when I was doing my housemanship. We are finally together at School of Medicine and Health Sciences, University for Development Studies, Tamale. What a coincidence.

As an experienced researcher and having supervised a number of students in his career, Francis easily fitted in well with my PhD project without any difficulty. Francis was an indispensable part of planning and writing of the studies. He was very meticulous in his feedback, spotting where all the punctuation marks should be, the grammar and reducing my long sentences into simple and shorter sentences, making clearer the message we were putting across. He facilitated my data collection by writing letters to all the Deans of the medical schools in Kumasi, Cape Coast and Accra to give me their support to interact with their students. When the going was getting tough with some of the schools, he followed up with personal telephone calls to some of Deans. I appreciate the crucial role you played in securing ethical approval from KNUST, Kumasi, even though I had one earlier from Tamale Teaching Hospital.
I owe my sincere thanks to you and to indicate that your supervisory skills helped me reach this milestone in my PhD trajectory.

Furthermore, I am very grateful to Dr. Emmaline Brouwer, my counterpart project manager of NICHE 082 for her special support during my PhD work and also in the management of my project activities. You taught me how to combine my thesis with managing the NICHE project in Ghana. You facilitated all my travels not only to the Netherlands but also to other parts of the world where I had to make presentations of my work at international conferences and workshops. You have a special place in my heart and I did enjoy some dinner with you in your house. I wish to say DANKWOORD and AYEKOOO.

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Curriculum Vitae

Curriculum Vitae

Anthony Amalba was born on 15th October, 1962 in Bolgatanga, Ghana. He obtained his Ordinary ('O') level certificate in 1981 at Bolgatanga secondary school. In 1983, he obtained his advanced ('A') level certificate from Sunyani Secondary school. Thereafter, he did one-year national service at Bolgatanga secondary school. In 1984, he benefited from the Government of Ghana Scholarship scheme to study Pharmacy at the Kharkov State Pharmacy Institute, Ukraine graduating in 1990. On his return to Ghana, he did his houseman ship/ national service at Komfo Anokye Teaching Hospital (KATH) from 1992-1994. Then he wrote his Pharmacy Qualifying Professional Examination in 1993 and got registered as a Pharmacist in 1994.

He was posted to Yendi hospital, in the Northern Region to work as the District Pharmacist from 1994-1997. From July 1997 to December 1998 he worked at the Pharmacy Council, Accra, a regulatory body of the Ministry of Health as an inspecting Pharmacist.

He was transferred from the Pharmacy Council office in Accra to start a new zonal office in Tamale which was responsible for the three regions in the north. While working, he continued his education and obtained a certificate in Office Management and Administration from the Management and Development Productivity Institute in Accra in 1997 and a certificate with distinction in Public Administration from the Ghana Institute of Management and Public Administration (GIMPA) in 2000.

He joined the University for Development Studies, School of Medicine and Health (UDS, SMHS) as a part-time lecturer in 2004. After doing part-time teaching for some time he eventually left Pharmacy Council and Joined UDS-SMHS as a full-time lecturer in 2006.

On joining the University, he saw the need to do Education and so got enrolled and eventually graduated in 2008 with an international Masters of Science in Health Professions Education from Maastricht University, The Netherlands in 2008 and an MSc in Clinical Pharmacy from Kwame Nkrumah University of Science and Technology, Kumasi, Ghana, in 2009.

Anthony worked as a lecturer and head of department of the department of Pharmacology at UDS, SMHS. In 2007, he was appointed the Chairman of the Problem-Based Learning (PBL) Implementation Committee for SMHS and subsequently

appointed as the PBL Coordinator in 2008 when the Education unit was created under the office of the Dean.

He has been involved in the Netherlands University Foundation for International Cooperation (NUFFIC) Projects through a Netherlands Initiative for Capacity building in Higher Education (NICHE) project 082 and NPT 135 Project. He played a leading role organising international workshops in collaboration with experts in medical education for staff in and outside Ghana and managing the NICHE 082 Project serving as the project manager. He participated in a number of workshops organised by NUFFIC on project management, twice in Lusaka, Zambia and in the Hague, The Netherlands.

Apart from teaching pharmacology to medical, nursing and biomedical laboratory students over the years, Anthony facilitates staff development workshops in topic relating to the principles and theory of PBL, how to conduct PBL tutorials, interactives lectures and assessment for students and staff. He participates in curriculum development and review processes as well as coordinate teaching and learning activities at SMHS.

Anthony was appointed as head, Department of Health Professions Education and Innovative Learning (DHPEIL) when the department was created in 2015. DHPEIL was awarded a certificate as the Regional Centre of Expertise in Problem Based Learning by the SHE Collaborates team, Maastricht University, the Netherlands in 2015. He was promoted to the position of senior lecturer in 2016.

Anthony is a fellow of the West Africa Postgraduate College of Pharmacists and the Ghana Postgraduate College of Pharmacists. He initiated the idea of establishing a Pharmacy school at UDS and he was appointed the Chairman of the Pharm D curriculum development committee. The PharmD programme which is a department under SMHS is slated to take off this 2018-2019 academic year.

Anthony has been working on his PhD project since 2013, which is described in this thesis, at the School of Medicine and Health Sciences of the University for Development Studies. In the course of his PhD project he has participated and presented abstracts at international and local conferences including the first international AfreHealth conference in Accra in 2017, the TUFH Network conference in Fortaleza, Brazil in 2015 and Johannesburg, South Africa, in 2016 and the Rogano conference at the University of Milan, Italy in 2014.

His research interest includes health professions education, inter-professional education, pharmacy practice. He continuous to teach, mentor students and develop courses in health profession education, Pharmacy and conduct research in SMHS. Anthony has several publications in peer-reviewed journals and has peer reviewed a number of articles for BMC Medical Education journal. In future he will focus on designing and implementing intervention studies to improve the practice of medicine and pharmacy.

In December 1997 Anthony married his wife, Christiana, a nurse-midwife, who heads the Midwifery department of the Tamale Nurses' and Midwives' training College. They have a son, Kevin currently at St. Francis Xavier Senior High School, Wa. They live together in Tamale but hail from Zaare in Upper East Region.

Anthony Amalba loves football and athletics and enjoys traveling to interesting places around the world.

List of publications

List of publications

1. **Amalba A**, Abantanga FA, Scherpbier AJJA, van Mook WNKA. Working among the rural communities in Ghana - why doctors choose to engage in rural practice. BMC Medical Education 2018;18(1):133. https://doi.org/10.1186/s12909-018-1234-y.

2. Ameade EPK, **Amalba A,** Mohammed BS. (2018). Prevalence of dysmenorrhea among University students in Northern Ghana; its impact and management strategies. BMC Women's Health 2018;18(1):39. https://doi.org/10.1186/s12905-018-0532-1.

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Abbreviations

Abbreviations

BEME	Best Evidence Medical Education
CHPS	Community-Based Health Planning and Services
COBES	Community-Based Education and Service
COME	Community-Oriented Medical Education.
FHML	Daculty of Health, Medicine and Life Sciences
KNUST	Kwame Nkrumah University of Science and Technology
KNUST-SMS	Kwame Nkrumah University of Science and Technology School of Medical Sciences
LAMICs	Low-and-Middle-Income Countries
LICC	Longitudinal Integrated Clinical Clerkship
MDG	Millennium Development Goals
MEPI	Medical Education Partnership Initiative
MHPE	Master in Health Professions Education
MOE	Ministry of Education
MOH	Ministry of Health
MU	Maastricht University
NICHE	Netherlands Initiatives for Capacity development in Higher Education
PBL	Problem-Based Learning
PHC	Primary Health Care
SHE	School of Health Professions Education
SMHS	School of Medicine and Health Sciences
SMS	School of Medical Sciences
SOM-UHAS	School of Medicine of the University of Health and Allied Sciences
TTFPP	Third Trimester Field Practical Programme
TTHERC	Tamale Teaching Hospital Ethical Review Committee
UCC-SMS	University of Cape Coast School of Medical Sciences
UDS	University for Development Studies
UGSMD	University of Ghana School of Medicine and Dentistry
UNDP	United Nations Development Programme
WHO	World Health Organisation